THE

FOUNDRY TRADE JOURNAL

WITH WHICH IS INCORPORATED

THE IRON AND STEEL TRADES JOURNAL

VOL. 52 Thursday, February 7, 1935 No. 964

PUBLISHED WEEKLY.

Subscription Terms: 15s. per annum.
Foreign and Colonial: 17s. 6d. per annum.
All Subscriptions are payable in advance.

All Communications to be addressed to the Editor, the Advertisement Manager, or the Publisher of

THE FOUNDRY TRADE JOURNAL,
49, WELLINGTON STREET, LONDON, W.C.2

Telegraphic Address: "Zacatecas, Rand, London."
Telephone: Temple Bar 3951 (5 lines).

THE FOUNDRY TRADE JOURNAL IS THE OFFICIAL ORGAN OF

The Institute of British Foundrymen
The Institute of Vitreous Enamellers
The National Ironfounding Employers' Federation
The Welsh Engineers' and Founders' Association
and
The Foundry Trades' Equipment and Supplies Association

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High Grade or Low Grade?

A speaker in London recently, dealing with engineering products, asked what was the good of this country fiddling away on the production of stuff to sell at £90 a ton when, in 1934, we imported machinery to the extent of over ten millions sterling, valued at £200 a ton. This restates in another way what we have frequently pointed out. If Great Britain wishes to maintain the standards of living set up through our early start in the race for industrial leadership, it can only be done by keeping in front. We have to get to the front and stay there. There is no place for us as the world's hewers of wood and drawers of water. It is inevitable that other countries should wish to follow our example. Our men have often taught them, and we have sold the machinery on which the production of products is based. It is inevitable that countries should wish to be nationally self-sufficing. They may learn from growing economic wisdom, and perhaps increasing world security, to diminish trade barriers, but it would be unwise for us to count on it. But we must export.

So far as the foundry industry is concerned, practically no civilised country to-day requires to import the commoner foundry products. The Dominions are self-supporting in this respect. Now common foundry products will always be needed, and it would be foolish to argue that they should not be produced. But if our argument is correct, the industry should develop towards increasing specialisation in application and increasing standards of quality.

The founder, as such, is often powerless to control the production of highly-specialised machines in the £200 a ton class, but he can at least do his part when the need arises to offer castings which, in respect of weight, strength, finish and general attractiveness, offer the greatest opportunity of successful operation and export. Some of our finest specialised foundries supply machine makers, and some of our finest machine makers have developed their own highly-specialised foundries. But in the case we have in mind, the jobbing founder is the man most likely to be called upon to supply castings to specialist manufacturers not large enough to operate their own foundries. We must take to heart the amazing changes brought about in a very short time in Russia and Japan, as well as in our own Dominions, before settling down to the comfortable jog-trot of our present development. We call to mind a machine for testing a quality which was not heard of five years ago, and yet in Germany three or four commercially-made machines are available. Not one is made here, nor is there any demand.

The Case of the Small Foundries

It is usually imagined that only those plants lending themselves to the production of large quantities of smelting articles can be mechanised profitably. This is the wrong angle to approach the problem. The proper method is to divide the conduct of operations into an appropriate number of departments, to envisage expansion, and to ascertain the costs of handling in each one. The foundry usually divides itself up into the handling of raw material on its arrival, melting and distributing liquid metal, carrying sand to the moulders, and back to the reconditioning plant, and handling the moulds. A similar set of conditions applies to coremaking, plus the baking and distribution to the moulders. Finally, there is the handling of the castings from their place of manufacture to the final despatch.

All foundries can explore the cost of these various movements, even though it be a pure approximation based on visual observation. even in the very smallest foundry, where the few labourers employed are at different times engaged on taking the charge up a ladder to the cupola platform, helping to carry metal, shifting sand and castings, simple mechanisation can still help. It so happens that in such foundries, there is much essential work easily done by unskilled labour, which is left undone. For example, windows are not cleaned sufficiently frequently, the roadways are ill-conditioned, the cupola casings lack a protective coating, a general tidying-up is indicated. Thus, if a hoist is installed for handling the charges, a few hours per week are gained; a runway spanning the box and raw-material storage will also economise labourers' time. A well-designed corner of the shop for daubing and drying shanks saves both time and dirt. So it can be said of other sections. But the time so saved should be utilised in smartening up the whole shop.

The rather larger type of foundry may conclude that the output from the moulders is inadequate. Then the installation of a pattern-repairing department and moulding machinery is indicated, having in mind the later provision of handling equipment for the service of the latter. These lines are written because of numerous cases which have come to our notice from smallish foundry owners who complain that,

(*Concluded on page* 106)

XUM

Correspondence

[We accept no responsibility for the statements made or the opinions expressed by our correspondents.]

Factors in the Economic Conduct of Vitreous Enamelling

To the Editor of THE FOUNDRY TRADE JOURNAL.

SIR,—Replying to Mr. J. H. D. Bradshaw's comments in your issue of January 17, and Mr. W. Todd's in your issue of January 24. I would state that my remarks were based on actual results obtained in our own works.

Cupola Practice.—The metal/coke ratio is obtained from a cupola which has been lined down to 2 ft. 4 in. in diameter, slightly gathered in towards the top. Four tuyeres only are in use, their size being 6 in. by 2½ in. The coke bed charge is 4 cwts. 2 qrs. Subsequent charges are as follow:—

	Cwts.	Qrs.	Lbs.
Coke	–	3	20
Pig-iron	7	3	0
Heavy scrap	1	2	0
Light scrap	6	0	0
Limestone	–	1	8

The cupola is blown each day for 4½ hours continuously. Sizes of castings made vary from ¼ lb. to ½ cwt. I should welcome a visit from Mr. Bradshaw to our works, when he will be able to verify the metal/coke ratio stated.

Majolica Spraying Process.—With regard to my remarks in connection with the non-successful attempts made to produce a majolica effect with a liquid spraying enamel, I agree that I did not offer any explanation of this. However, the reason put forward by Mr. Bradshaw confirms my own opinion on this matter.

Majolica Dusting.—After carrying out a number of recent tests with a lead-free dusting enamel I have found that reasonably satisfactory results can be obtained, but up to the present have come to no definite conclusion as to whether this compares commercially with a lead-bearing enamel, especially when light pastel shades are required.

Acid Resisting.—In making this statement I did not mean to infer that the use of angular steel shot altered the properties of the acid-resisting enamel itself. Our experience was that when fusing enamelled castings which had previously been blasted with angular steel shot only, it was impossible (with the acid-resisting enamel used at that time) to produce a satisfactory finish. Pin holes and bubbles appeared, increasing the porosity of the enamel, and thereby reducing its resistance to acid in addition to producing unsaleable articles. After reverting to flint grit our troubles disappeared, and upon taking this matter up with our enamel suppliers they confirmed our findings and stated they had come up against two other large firms whose experience had been the same as ours. The cause may have been due to some peculiarities in the enamel used, which is borne out by the fact that I have recently tried out an acid-resisting enamel just put on the market and found the previous trouble does not occur when using angular steel shot only.

However, I still think that more constant, satisfactory and economical results are obtained by the use of flint grit, and this opinion was substantiated by Mr. Fletcher in his remarks published in the FOUNDRY TRADE JOURNAL of December 27, 1934, when he stated that he used flint grit exclusively. As a trial, steel shot only was used for a week, when it was found that the output of blasted casting dropped considerably; the men worked on the same piece rates, and earned far less wages during the week steel was used.

It is pleasing to note that Mr. Todd, in the final paragraph of his letter, agrees that there is need for considerable improvement in sandblast equipment generally.—Yours, etc.,

J. H. COUPE.

63, Ridge Avenue,
Winchmore Hill, N.21.
February 4, 1935.

American Foundry Conditions

To the Editor of THE FOUNDRY TRADE JOURNAL.

SIR,—In your report of the discussion on my Paper on my recent trip to America which appears in your issue of January 31, reference is made to the "Harnischfeger Company and their 'Bucyrus' excavator." Actually the Harnischfeger Corporation and the manufacturers of the "Bucyrus" excavator in America are, I understand, two entirely separate companies, and I did not give any indication that they were associated or connected in any way.

Referring also to the last paragraph on page 97, I think I described Saginaw as a *comparatively* small town as compared with Chicago; actually Saginaw has a population of about 60,000.

I realise that it is necessary for remarks on a discussion such as this to be somewhat condensed; it is probably during the condensing process that the errors have crept in.—Yours, etc.,

TOM MAKEMSON.

St. John Street Chambers,
Deansgate, Manchester, 3.
February 1, 1935.

The Case of the Small Foundries

(*Concluded from page* 105)

whilst they can get plenty of orders, the trading results are unsatisfactory. Delays are caused when hand-moulding by inadequate patterns, owing to delay in being served with moulding boxes, poor sand supply, improvised tackle, shortage of tackle, and waste production. Thus a trial should be made giving every facility for rapid production by organised planning, and if no improvement be shown, then if the foundry is to be continued and the staff retained, there is no alternative but to take steps to mechanise by the installation of moulding machines, bearing in mind that they need, for obtaining their maximum production, a continuous supply of properly-prepared sand and a method for taking away the moulds so made.

Symposium on Foundry Practice

The winter symposium of the Giesserei Institut of the Technische Hochschule of Aachen will take place on Friday and Saturday, February 15 and 16, 1935. On the first a number of Papers will be read, including "Aluminium Castings from Scrap Metal" by PROF. DR. H. NIPPER; "Annealing Processes in Aluminium Bronzes" by DR. E. SÖHNCHEN; "On the Effect of Wall-Thickness on the Properties of Alloy Cast Iron" by PROF. DR. E. PIWOWARSKY; and "The Formation of Graphite in Grey Iron" by DR. H. NIPPER. In the afternoon DR. E. SÖHNCHEN will discuss raw material problems of the German metallurgical industries, and PROF. DR. E. PIWOWARSKY will deal with his last trip to the United States to attend the fifth international foundry congress and outline the substance of the principal Papers read. Saturday will be devoted to visits to various works in the neighbourhood of Aachen. On Friday evening there will be an informal social gathering or "Kameradschaftsabend" at the Keir Hotel. Full details of the programme and of the arrangements may be obtained from Prof. Dr. E. Piwowarsky, Giesserei-Institut der Technischen Hochschule, Aachen.

Random Shots

The story is being told of a foundry salesman who had made a business call of lengthy duration and who found, on leaving his client's office, that a policeman was taking particulars of his car, which he had left by the kerb during his visit. A summons seemed to be imminent. The foundry salesman, nothing if not a man of resource, sped from the scene to another part of the town, and then telephoned the police to say that his car had been stolen. He avoided the summons, but, of course, laid himself open to what might have been a more serious charge if, as may have happened, a detailed account of his movements had been called for and investigated.

* * *

In the ordinary way, only the stolen cars are abandoned in this country. Not so, apparently, in the States. There, considerable annoyance and obstruction are caused by people abandoning their old motor-cars in the street. If your 1922 Spitzer has declined into sad old age, when every chug of the engine threatens to be the last, you might drive up before the magnificent portals of the Hotel Splendiferous, climb out and enter the hotel, leave by another door and walk on to the nearest auto dealer to buy (on instalments) that new $600 Dreamline saloon the wife has been talking about for the past eight weeks. Of course, only the more audacious folk, with a subtle sense of humour, would follow that procedure. The citizen with a keener sense of public responsibility leaves the car in a field, on a river bank, or in an old quarry, where the police will not be unduly troubled by it.

* * *

This car-abandoning habit in and around New York has become such a nuisance that official "cemeteries" are to be laid out, where worn-out cars can be dumped and no questions asked. The city's sanitation department is looking after the cemeteries, and the cars left in them will be disposed of by the sanitation officials.

* * *

This step taken by the authorities will be a sad blow to one small section of the community, for people are reported actually to make their living by dismantling cars directly they are abandoned; although what there is left to dismantle after the owner's attentions is a mystery. "Marksman" thinks it might be worth while for some of the foundries to engage special mobile dismantling squads who could scour the district for derelicts and return with all unwanted cylinder blocks. This would provide a supply of cheap, good-quality cast-iron scrap.

MARKSMAN.

Disintegration of Iron-Aluminium Alloys

In the "Zeitschrift für Metallkunde," F. ROLL describes the disintegration of iron-aluminium alloys. It was found that alloys of Fe with 25 to 50 per cent. Al disintegrate on exposure to the air if as little as 0.2 per cent. C is present; on the addition of copper, alloys with 18 per cent. Al also disintegrate. This effect is accompanied by the formation of gaseous and liquid hydrocarbons including acetylene and is attributed to the presence of AlC_3.

"British Coal, Iron and Steel"

Messrs. Baldwins, Limited, of Baldwin House, Great Trinity Lane, London, E.C.4, have issued through Messrs. E. J. Burrows & Company, Limited, publishers, 125, Strand, an interesting book, "British Coal, Iron and Steel," giving a brief survey of the productions of the firm. The publication is illustrated by five photographs by P. G. Hopcroft, F.R.P.S. It gives a short history of the firm, and chapters on coal, iron, from iron and steel, and steel in modern life, as well as details of the organisation of the firm, the manufactures and annual capacities of the various works, and a list of branches and their products.

Some Aspects of Plant Lay-Out and Production*

By J. T. GRAY

Obviously it is impossible to deal in one Paper with every type of equipment and plant lay-out to cover the production of all classes of enamelled ware, and therefore no effort has been made to embrace the entire field.

Until quite recently the enameller was left to solve his equipment problems for himself. It would appear that the manufacturers of the various equipment utilised in the enamelling trade did not consider the industry sufficiently important to warrant the attention of their designers being directed to the evolution of improved equipment.

Probably amongst the equipment manufacturers, the furnace-makers were the first to realise the necessity for special attention being paid to the development of furnaces and furnace equipment of higher efficiency, but there are now established firms who specialise exclusively in equipment for the various branches of the enamelling trade.

Mechanised Plants

Owing to the rapid development of enamelling in this country and the potential market available, a number of the larger firms have reached the point where the installation of continuous plants is being considered more seriously than hitherto.

The complete mechanisation of enamelling plants has been carried out to a very considerable extent in the United States and in other countries, but so far the British enameller does not seem to have been able to make up his mind whether the output of his individual plant warrants such mechanisation.

The author is forced to the conclusion that the delaying of a decision on this matter has not reacted to the disadvantage of the manufacturers in Great Britain, as the comparatively large and continuous output resulting from completely mechanised plants involves limited variation in the class of ware being produced, and necessitates a steadily expanding market being available for the products. It also introduces a need for extensive storage space to accommodate the large volume of work in circulation.

It must be borne in mind that the mechanised plant requires to be operated at its maximum output for a number of years to recover the capital invested. Statistics available prove that it only requires a comparatively small reduction in output for a completely-mechanised plant to operate at a loss.

Reports are now reaching this country to the effect that a number of the highly-mechanised plants in the United States have produced at such a high rate as to saturate their market, with the result that they have been forced for economic reasons to close down continuous plants and revert to batch-type furnaces with manual operation.

There is a further aspect of this matter which is worthy of consideration and that is, if the necessary forethought is put into the planning of the lay-out of ordinary static-enamelling equipment and the same amount of organisation is applied to the system of processing the work through the department, as is essential in the case of a completely-mechanised plant, the margin of saving on production cost due to complete mechanisation would be greatly reduced.

It has been said that it is impossible to have a steady, continuous flow of work to and through the ordinary enamelling shop, but if such plants were completely mechanised a steady, continuous flow of work to and through the department would be vital, otherwise the plant could not possibly operate efficiently.

The rotary-frit smelter was introduced to replace the old direct-fired static reverberatory type. The primary claim for this type of smelter is speed of operation and thermal efficiency.

The original intention was that the furnace should rotate continuously during the entire smelting period, but a number of enamellers have discontinued this practice in favour of allowing the smelter to remain stationary for, say, ten minutes and then revolving the drum one half-turn, thereby bringing the hot upper

FIG. 1.—STATIONARY FRIT-MELTING FURNACE, THE WASTE GASES FROM WHICH ARE USED BENEATH THE DRYING TABLES SHOWN IN THE FOREGROUND.

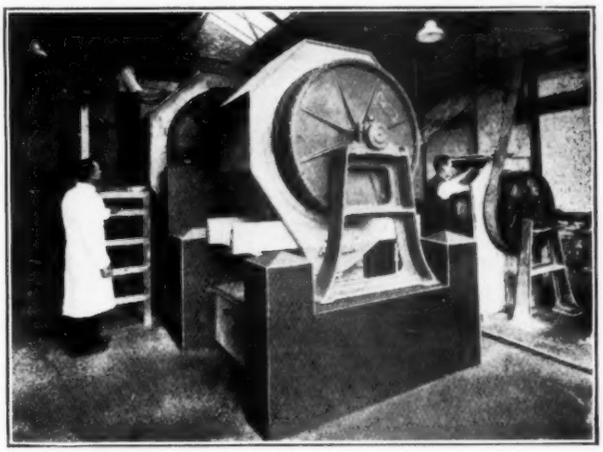

FIG. 2.—DRY-GRINDING MILL ROOM.

FIG. 3.—THE "COUPE" DUSTING BOOTH.

* A Paper read before the The Institute of Vitreous Enamellers. Mr. B. B. Kent presiding.

part of the furnace to the bottom, and repeating this half-turn every ten minutes.

It is claimed that, with continuous rotation, the frit in its semi-molten state trickles down from the upper half of the lining, and a considerable proportion of this is blown out of the exhaust owing to the high velocity of the flame. It is possible that the high flame velocity carries into the flue an important percentage of the lighter ingredients from the cold batches immediately after charging.

The attention of users of the rotary smelter

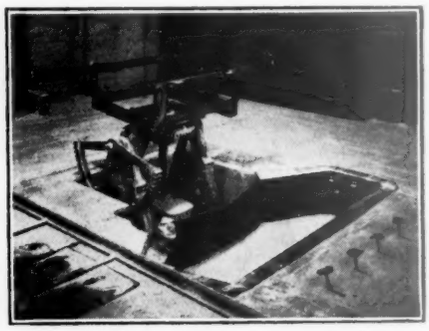

FIG. 4.—DUSTING CRADLE FOR BATH ENAMELLING.

should be directed to this point. Some enamellers consider that, owing to the drastic direct firing of the rotary smelter, there is always a possibility of contamination through carbon formation, but this is a matter of opinion which has not been definitely determined.

The efficient capacity of a furnace of this type, 6 ft. long, 27 in. in diameter (inside dimensions), has been found to be approximately 500 lbs. of frit per charge (the capacity is given approximately in terms of output, as, of course, the specific gravity of the batch varies).

The average time for smelting this batch of 500 lbs. of frit is three hours, and the average oil consumption is 96 galls. (or 864 lbs.) per ton of frit. Some batches take only 2½ hrs.; some longer. The average is 3 hrs. Fig. 1 shows a pair of stationary reverberatory smelters, the dimensions of the smelting hearth being 4 ft.

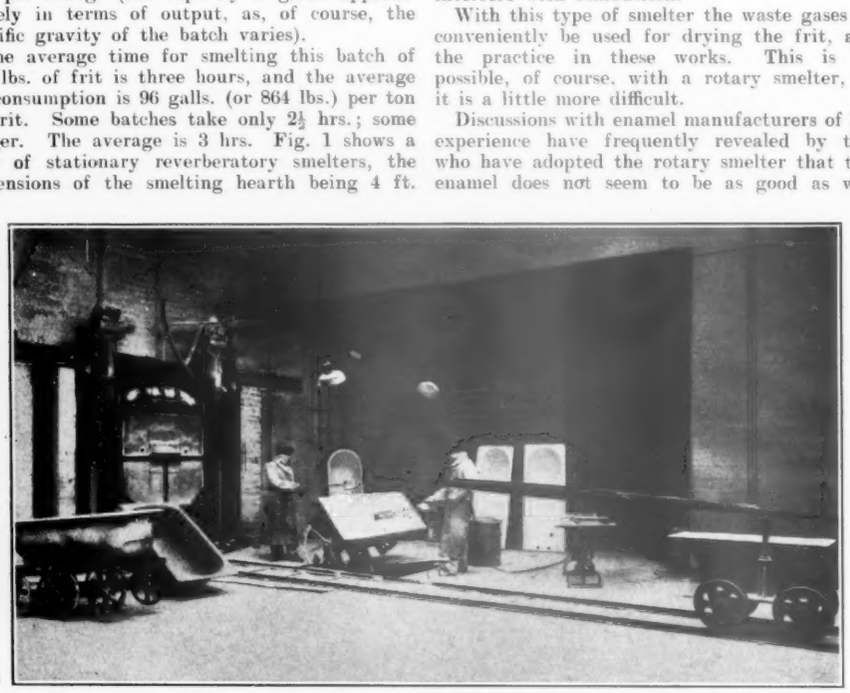

FIG. 5.—FOOT-PEDAL-CONTROLLED DUSTING CRADLE IN OPERATION.

10 in. by 5 ft. 6 in. The capacity is approximately 1,700 lbs. of frit per charge, and the average time for smelting this batch is eight hours. The oil consumption is 105 galls. (or 945 lbs.) per ton of frit.

The above figures of comparison between the rotary and static reverberatory smelter, show that there is little difference in speed or efficiency between these two types. There is a slight difference, definitely in favour of the rotary furnace.

With this type of reverberatory furnace the question of contamination is almost entirely eliminated, as the combustion chamber is built separate from the smelting chamber. The incandescent gases from the fuel oil are delivered into the smelting chamber by way of a series of ports. In the furnaces illustrated three ports each 10 in. by 11 in. are used. Owing to the fact that combustion is completed before the heat generated is utilised, the introduction of cold batches into the smelting chamber does not interfere with combustion.

With this type of smelter the waste gases can conveniently be used for drying the frit, as is the practice in these works. This is also possible, of course, with a rotary smelter, but it is a little more difficult.

Discussions with enamel manufacturers of long experience have frequently revealed by those who have adopted the rotary smelter that their enamel does not seem to be as good as when they used the reverberatory type. The author has not been able, however, to obtain a definite statement as to how or why the enamel varies.

Arising from these remarks on frit smelters, it seems germane to postulate to questions:—(1) Is there a loss of the lighter ingredients such as soda ash and zinc oxide, by way of the flue owing to the high velocity of the gases in the rotary smelter, and, if so, does this loss alter the composition of the resulting frits? and (2) in the case of the static smelter the operator has more control over the final temperatures, and the soaking period can more easily be defined both from a point of view of time and of temperature. Has this a bearing on the quality of the frit produced?

FIG. 6.—ELECTRICALLY-OPERATED SIFTING MACHINES.

Frit-Grinding Mills

Fig. 2 shows a dry-enamel grinding-mill room. The larger mills shown have a capacity of 1,120 lbs. and the peripheral speed of this class of mill should be 300 ft. per min. The grinding time of an average dry enamel in this size of mill is approximately 22 hrs.—or one grind per day. In dry grinding, porcelain balls are used as a grinding medium. Flint pebbles cannot be used for this purpose as they chip and leave a scale in the enamel which cannot be removed. This is such an important matter that some manufacturers go to the length of using a grinding medium made of the same material as the enamel.

To do this they extract what may be termed large "rocks" of enamel from the smelter and charge these into the mill with the frit. The best practice is to use a much lower weight of grinding balls in proportion to the frit in dry grinding than in wet grinding. In the mills illustrated, 800 lbs. of porcelain balls are used for grinding 1,120 lbs. of frit.

Linings of manufactured porcelain blocks are extensively used and give considerable service. In some cases linings of much harder material, such as Silex, are used, and one of the mills in the illustration has a Silex lining which has been in continuous use since 1919. Silex linings are usually from 6 to 8 in. thick when new, and reduce the capacity of the mill accordingly. The speed of these mills is an important matter as there is no water to assist in suspension; therefore the blow of the grinding balls is much heavier than in wet grinding. Once a mill is started on any particular colour (or white) enamel, it is never used for the grinding of any other colour. To clean out a mill for the purpose of changing from one colour to another is so costly and laborious that it is, in fact, not practical.

Dusting Booths

Fig. 3 shows a dusting booth developed by Mr. J. H. Coupe. This comprises a cabinet of suitable size fitted with rotating and tilting table at bench height. This table is suitably drilled for drop-in jigs or spikes to hold the work being handled. The tilting and rotary motions are carried out by an assistant who has a clear vision of the job through a glass panel at the side of the booth. An extractor fan is

incorporated which allows for a velocity of about 50 ft. per min. at the mouth of the booth. This draft is so balanced as to prevent any enamel dust escaping into the shop, without, however, drawing any appreciable amount of enamel into the exhaust system. The bottom of the booth is fitted with a tray into which enamel

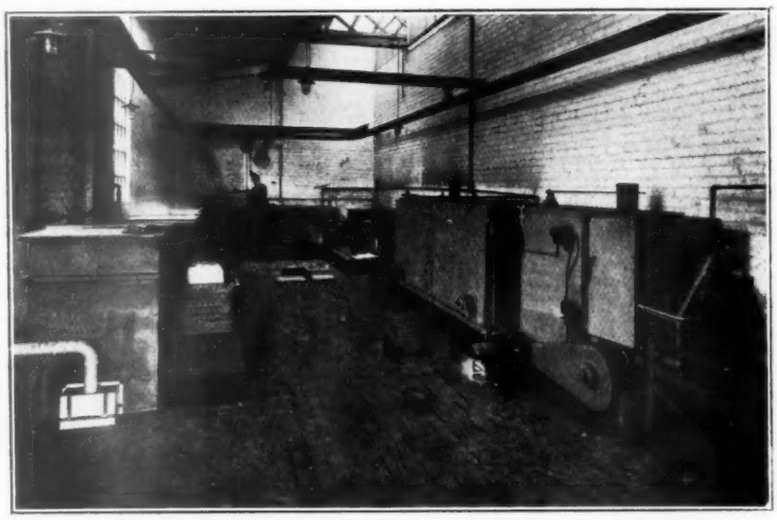

FIG. 7.—A TYPICAL PICKLING ROOM.

falling past the job is collected in a clean and re-usable condition.

The front of the booth is entirely open, so that the operator is not encumbered and has an uninterrupted view of the job. This machine is designed for dry process enamelling on small and medium-sized ware such as lavatory basins, fire surrounds, electric-fire fronts and similar work. These booths have been approved by the Home Office so that in addition to leadless dry-process enamels, majolica and other lead-bearing enamels can be employed with safety.

In the plant illustrated a considerable proportion of two-colour shaded work is carried out with the two booths, which are used in conjunction with each other. The hot castings are withdrawn from the furnace and placed in the first booth where the base colour is dusted. The casting is then removed to the second booth where the second or shading colour is applied. It is very often necessary—depending on the type of work—after the first colour is dusted, to return the job to the furnace for re-heating, for flowing down the base colour and also for flowing down the shading colour.

Bath Dusting

Fig. 4 shows a view of an all-electrically operated bath-dusting cradle. This machine has been introduced to the bath trade and has superseded the old cumbersome and slow hand-operated cradle. With this plant only two operators are required as compared with three or more with the hand-operated machine. The tilting is effected by a 2-h.p. motor, through worm and spur-reducing gear and quadrant, and ample angle of tilting is obtainable to suit any design of bath. Turning is also carried out by a 2-h.p. motor, through worm-reducing gear.

The foot-pedals can be arranged in any convenient position to suit the operator, and the starting, turning, tilting and stopping of the cradle are carried out by these foot-pedals whilst dusting is in progress.

Fig. 5 shows a battery of bath-enamelling muffles and shows the electrical dusting cradle in operation. It will be noted that the operator is controlling the motion of the cradle by the foot-pedals whilst dusting. The motion of the cradle continues only when the pedal is depressed; the operator has merely to remove his foot from the pedal as soon as the bath swings into the desired position. Pneumatic dusters are used and the dusting squad comprises two operators, whereas it was usual to employ three, and often four, men. The machine can keep the furnace going full time, and, of course, the deciding factor is the rate at which they can get the baths through the furnace.

Magnetic Separators

The earlier types of machines used were fitted with serrated primary poles, and it was found that these serrations had a retarding effect on the flow of the enamel and were difficult to clean. The newer machines have been specially designed for the treatment of enamel slop. The primary magnetic poles over which the enamel flows form a flat machined surface. It has been found that owing to its sluggish action it is not necessary to use serrated primary poles when dealing with enamel slop. The primary magnets are formed of hinged castings, which become magnets by induction from the primary poles. The magnetic field is concentrated in order to extract any finely sub-divided iron or other magnetic substances from the material being treated.

The flow of enamel slop is adjusted by regulating the strength of the magnetic field. This is carried out by operating a set-screw by hand. Owing to the planed surfaces, the cleaning of this machine is a very simple matter. The magnetic separator was first introduced to the enamelling trade for the treatment of enamel scrapings collected from the booths for re-use. Its application has been considerably extended, and a number of works now treat a large proportion of their new enamel (especially white) with this machine. A considerable amount of metallic residue can be extracted from any average enamel, and this reduces the possibility of black specks in the finished ware.

Sifting Machines

Fig. 6 shows an electrically-operated sifting machine. Many types of mechanically-operated sieves have been tried for the sifting of wet enamels, but it has been found that these separate the water from the solid material. This machine is of the vibrating type, and is operated by a ¼-h.p. electric-motor direct coupled to a geared reciprocator.

The hopper is mounted in rubber seatings, and a rubber buffer is used as contact between the sieve and the reciprocator, ensuring high resilience. A machine of this type, with 18-in. dia. lawn, will effectively sieve 960 lbs. of enamel ground to a coarseness of 11 units, and weighing 38 ozs. per pint, through a 30-mesh lawn, in 11 min. A further advantage of this sieve is that it assists in mixing the enamel. This machine is also extensively used for the sifting of dry enamels, and for oxides, etc.

Pickling Equipment

Fig. 7 shows a typical pickling room. The equipment comprises a degreasing plant, acid tank, water tank, soda tank and borax tank, in addition to a conveyor dryer. The baskets of work are conveyed through the various stages of pickling by means of an overhead runway which extends into the grip-coat dipping department. Fig. 8 shows the grip-coat dipping department and illustrates a battery of three grip-coat dip-

FIG. 8.—A TYPICAL GRIP-COAT DIPPING PLANT.

FIG. 9.—A GENERAL VIEW OF AN ENAMELLING SHOP.

ping tables for ordinary small and medium-sized ware. The dryers in this case, as other types, are described later in the Paper. These dryers are open at both sides so that the dippers charge their work direct into the dryers, and it is withdrawn from the opposite side, where it is adjacent to the grip-coat fusing furnace. This type of dryer can be effectively heated by gas burners at the bottom or by steam coils forming the shelves.

FIG. 10.—OIL-FIRED FUSING FURNACES CARRYING DOUBLE-DECKED CARRIER FRAMES.

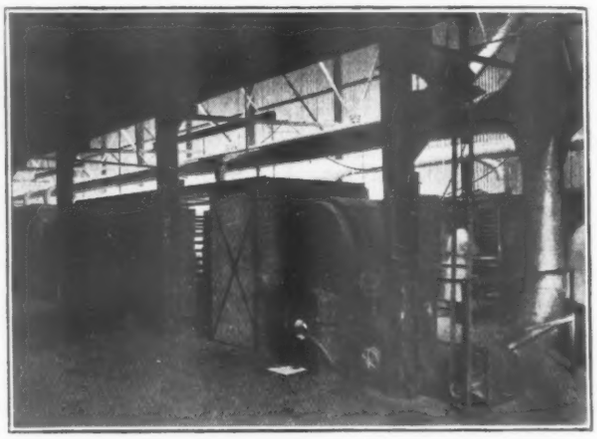

FIG. 11.—OIL-FIRED DRYING STOVES.

Fig. 9 gives a general view of an enamelling shop laid out for the production of flat sheet-iron ware, whilst Fig. 10 shows part of a battery of standard oil-fired fusing furnaces served by double-acting charging machines.

Special attention is directed to the method of double-decking the work on specially-designed double-deck nickel-chrome frames, and it will be seen that thirty electric-fire fronts per load are obtained in this 9-ft. by 4-ft. furnace. This design of frame is being used for larger furnaces, of 12 ft. and 15 ft., and for all classes of work where suspending is difficult.

Drying Stoves

A modern type of dryer, with independent oil-fired air heater, will carry three drying rooms, each 18 ft. long by 6 ft. wide, placed end on to each other. Each of the long sides of these rooms is fitted with a series of sliding doors, and the width of the dryer gives just sufficient clearance to allow for the trays being placed crosswise. Two boys place the skids and trays in position for the sprayers as they are required. The sprayer lifts her work from the booth, turns round, and places it in the dryer in a travel of about 7 ft.

Fig. 11 shows the heater end of such a battery of dryers. The heater is of the single-pass indirect type, and the average oil consumption is two gallons per hour. A 14-ft. diameter fan, displacing 4,500 cub. ft. of air per minute, absorbing 3 h.p., is used. The hot air is distributed through a ducting placed in a trench running centrally through the entire length of the three dryers. The top of this trench is covered by means of perforated plates.

At equal distances along the dryers a vertical branch pipe is taken from the main ducting. This vertical pipe is capped at the top and is provided with horizontal slots at 6 in. pitch throughout its height, through which the hot air is discharged into the dryer.

The object of this is to have horizontal currents of hot air passing between the trays of work. As in all dryers there is a slight temperature variation, and an actual test showed that the outdoor atmospheric temperature was 48 deg. Fah., the temperature of the first air outlet nearest the air heater was 184 deg. Fah., and the temperature at the farthest outlet from the heater was 170 deg. Fah.

A re-circulating system is incorporated, the air from the dryers being exhausted through outlets in the roof and returned to the heater by the overhead ducting. The temperature of this returned air immediately before entering the fan was 83 deg. Fah., and this installation has provided sufficient accommodation for the work of fourteen sprayers producing general cast iron and sheet steel parts.

Conveyor Type of Dryer

Fig. 12 shows a new type of conveyor dryer. In this installation double booths are placed at right-angles to the dryer. Along the side there are a number of rectangular openings, through which the sprayers place the work, either on trays or on hanging racks, according to the type of ware. The combined racks and trays are suspended from the conveyor track, and the design allows for loading the work either flat or suspended.

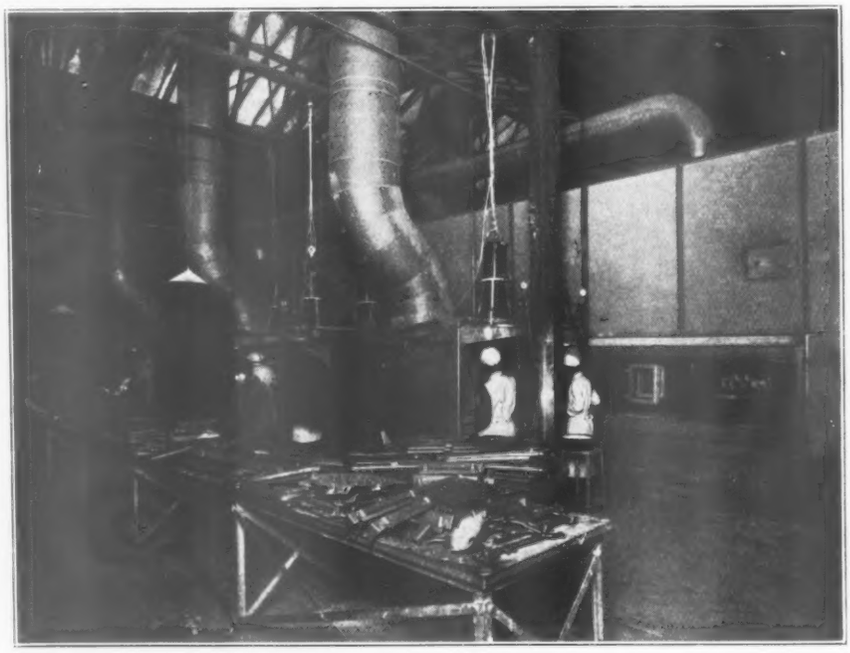

FIG. 12.—WASTE GAS FOR THE AUXILIARY OIL-FIRED CONTINUOUS DRYING STOVE.

This conveyor dryer accommodates the work of twelve sprayers, and the racks travel at bench height, returning along the overhead track to the discharge end, where the work is lifted off and is sub-divided on to various trays in the order required for fusing. Waste gases from the fusing furnace are utilised for the heating of the air by means of a multi-tubular double-pass heat-interchanger.

The waste gases are supplemented by an auxiliary oil-burner, which consumes approximately 2½ gallons of oil per hour. This burner is only required for about the first four hours of each day-spraying shift. A fan running at 1,420 r.p.m., absorbing 3 h.p., is used. The hot air is delivered from the heater to the conveyor dryer by means of overheat lagged ducting. A re-circulating system is employed.

Whilst a considerable amount of adjustment and alterations to the carriers were necessary in the early days of this equipment, a considerable amount of valuable data and information has been gleaned from this installation.

Operating Data

The temperature of the flue gases at the inlet end of the air heater was found to be 725 deg. Fah., and at the outlet 338 deg. Fah. The temperature of the air leaving the heater was 356 deg. Fah., and the temperature of the air discharged into the conveyor dryer was 320 deg. Fah., showing a fall of 36 deg. Fah. The tem-

(*Continued on page* 111.)

Distinguished Service Recognised

INSTITUTE'S NEW HONORARY MEMBERS

At a meeting of the Council of the Institute of British Foundrymen, held in Bradford, Sir William Larke, K.B.E., and Mr. S. G. Smith were elected honorary members. Both these elections have been well deserved. Sir William, since his election as a member of the London Branch in 1927, has consistently used his great influence to stimulate interest in the foundry industry amongst the ironmasters. Mr. Smith has received the honour on account of his pioneer endeavours to convert foundry practice from rule-of-thumb to a technical basis. We append the biographies of the two recipients of this honour.

SIR WILLIAM LARKE, K.B.E.

SIR WILLIAM LARKE, K.B.E., is well known as Director of the British Iron and Steel Federation. He is also a Vice-President of the Iron and Steel Institute, Past-President of the Institute of Fuel (1934), a member of the Institute of Electrical Engineers, a member of the Institute of Mechanical Engineers, a member and sometime manager of the Royal Institution, and a member of the Board of the National Physical Laboratory. He has been a member of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research, Director-General of Raw Materials (Metals, Chemicals and Explosives), 1919-22, and a member of the Disposal Board, 1919-22.

SIR WILLIAM J. LARKE, K.B.E.

Sir William received his early training with Messrs. H. F. Joel & Company and Messrs. Siemens Bros. & Company. He joined the British Thomson-Houston Company, Limited, in 1898, was engineer and manager of the Power and Mining Department from 1899 to 1912, and from 1912 to 1915 he occupied the position of Chief Executive Engineer. His services were loaned to the Ministry of Munitions in July, 1915, in order to assist in its organisation. As Director in the Controlled Establishments Section he devised and introduced the Priority of Work Order for controlling munitions output and the distribution of labour and materials in March, 1916. He reorganised the Badges and Exemptions Section, of which he became director in June, 1916. In January, 1917, he reorganised and became Director of the Dilution Section. He was a member of the Hill's Committee (Skilled Day Workers' Rates) in October and November, 1917. Later, he was Technical Adviser to the Secretariat for special service in connection with demobilisation and reconstruction and also a member of the Council Committee on Demobilisation and Reconstruction. He became chairman of the Committee on the Utilisation of Surplus War Material in January, 1919, and organised, as Controller, the Section for the Disposal of Miscellaneous Stores, becoming chairman of the Committee on the disposal of Mechanical Transport in February, 1919. In addition, he was chairman of the Engineering Commission to inspect German Factories in the Occupied Territories, May, 1919. Sir William Larke was made O.B.E. in 1917, C.B.E. in 1919, and K.B.E. in 1920.

MR. S. G. SMITH

Mr. Smith was an indentured apprentice moulder to Mr. Henry Challingsworth, of Alexandra Foundry, Newport, Mon, but after four years, to put it bluntly, he, like many other ambitious youths, ran away. A period of roving took him to various parts of England, until he received his first position as foreman with Cochrane, Grove & Company, Ormesby Iron Works. Next he was loam-foundry foreman to the Staveley Iron & Coal Company, and then foundry manager to Messrs. Cole, Marchent & Morley, of Bradford. Upon leaving there, and until his retirement on reaching his seventieth birthday, Mr. Smith was on the staff of the Metropolitan-Vickers Company at Trafford Park, occupying the position of assistant superintendent, and later consulting founding specialist. Mr. Smith joined the Institute in 1909, and was President of the Lancashire Branch in 1926. He has been a prolific writer on foundry topics, and a lecturer in foundry practice.

MR. S. G. SMITH.

Some Aspects of Plant Lay-Out and Production

(*Continued from page* 110.)

perature in the dryer at the loading height of the conveyor was 120 deg. Fah. At the top of the dryer in the space occupied by the return track the temperature was 130 deg. Fah.

The time taken to dry a flat casting weighing 18½ lbs. was 25 min. Castings weighing 12½ lbs. took 20 min. These figures were taken without the auxiliary burner being in operation. The speed of the conveyor is 2.5 ft. per min. and to complete the cycle of the endless conveyor occupies 50 min. That means that the casting is in the dryer for an average time of about 40 min., and in view of that length of time, the drying speed does not matter. The only question that matters is that of rust spotting—and there is definitely none in this installation.

(To be concluded.)

Metals in Furnace Construction

M. BASSAL, in "Revue Métall.," discusses the requisite properties of cast iron and steels for use in the construction of casings, tie-rods and interior parts of various types of furnaces, and indicates the suitability of various ferrous alloys for these purposes.

Scrap Importers' Difficulties

FROM A CORRESPONDENT.

From the difficult situation which has arisen in lead and spelter it is fairly evident that taxation of raw-material imports has not been a success, and there are many who would be glad enough to see a return to a system of free imports. At the time of writing no decision has been reached by the Board of Trade, for the I.D.A. Committee is still pursuing its investigations, but it seems possible that at least a recommendation to drop this unpopular impost will be made to the government by that body. Owing to the suspension since its inception of the 2d. per lb. duty on foreign copper, trading in this metal has not been handicapped, but much trouble is being experienced by dealers in scrap metals, not because there is a tax on old metal, but because the authorities, with irritating frequency, persist in classifying much of what arrives at our ports as new material.

At first sight it seems perhaps absurd that the customs authorities should be at any trouble in differentiating between manufactured articles and metal intended for no more important purpose than melting, but those not accustomed to dealing with scrap can easily go astray. Certain types of scrap as, for example, waste made in various processes of manufacture, are fairly obviously raw material for the foundry, and a bill of entry under such a classification would hardly be queried, but when it is a question of manufactured articles, no longer fit for their original use, but, nevertheless, retaining their familiar shape, one can understand that queries will be raised. No wonder then that the customs authorities have from time to time fallen into error, for, after all, it is their job to be suspicious, and they can hardly be expected to embrace the creed that the importer should be given the benefit of the doubt!

Actually, the wording of the Act governing the free entry of scrap is not too happy, for it lays down a definition that the incoming material shall be fit only for recovery of metal, and there are, of course, occasions when there is every indication that an outlet other than the melting pot might be found. Fired brass cartridge cases, for example, of which this country has from time to time imported many hundreds of tons, have been held up by the customs and payment of duty insisted upon, in spite of the fact that definite assurances that the material would be melted have been given by the importers. Cartridge cases have, of course, always been a typical raw material for foundries, and after the war thousands of tons were melted, but this is now ancient history and H.M. Customs should perhaps be forgiven for supposing that cartridge cases can be reloaded.

Perhaps the most difficult items for consideration are brass and copper tubes, and matters have not been improved by the application for an increase of the duty on copper tubes which recently went forward to the I.D.A. Committee. As a matter of fact, the volume of imports of tubes from abroad has dwindled sadly since tariffs were instituted, for, although the importer can place his purchase at a price which will cover the duty imposed, he can only do this provided that the tubes turn out to be sound enough to redraw. The alternative is the melting pot, which means a sale at a price involving the importer in serious loss, for there is no provision at present under which the merchant can reclaim the amount of the duty paid on the tubes on the basis of manufactured material. These anomalies certainly cry out for adjustment.

MEMBERS OF THE Plymouth Blacksmiths', Forge and Smithy Workers' Society, representing what is probably the oldest craft in the city, have held their first annual dinner.

Sheffield, The Foundry and the Machine Age

LOCAL FOUNDRYMEN'S ANNUAL DINNER

The important part played by the foundryman in the industrial activities of Sheffield was emphasised by MR. ROY STUBBS, President of the Institute of British Foundrymen, when he proposed the toast of "The City and Commerce of Sheffield" at the annual dinner of the Sheffield Branch of the Institute, held at the Grand Hotel, Sheffield, on February 1.

He observed that Sheffield was the birthplace of the high-grade steels which had made the present machine age possible. The fact that the next conference of the Institute was to be held in Sheffield showed that Sheffield was in the forefront of technical development. Sheffield evidently knew what a great future lay before her in the foundry business. It was true to say that without foundrymen industry would founder. Indeed, it could be rightly said that the foundryman's business was the foundation of the city and commerce of Sheffield. In the Sheffield research laboratories special steels had been discovered in infinite variety and in the workshops these were adapted to meet every requirement of modern engineering. The city was well to the fore in all modern developments, not the least of these being the foundry degree course at the University, to which the Institute had contributed so useful a share. The equipment of the laboratories was second to none, and he would like to thank Prof. Andrew, the Dean of the Faculty of Metallurgy, for the enormous work he had put in and for the help and advice he had given their Committees during the preliminary stages and discussion. Without his guidance they would never have made the progress they had done. He hoped that the time was not far distant when the results of his labours would be seen in overflow classes and vast extensions of the laboratories. He hoped that the forthcoming annual conference of the Institute to be held in Sheffield, when Mr. J. E. Hurst would be installed as President, would be a record gathering in every way.

THE LORD MAYOR OF SHEFFIELD (Alderman P. J. M. Turner), in response to the toast, remarked that the Institute was greatly indebted to the honoured name borne by the President for the presentation of a gold medal for those who were successful in research work in connection with the foundryman's profession. The Sheffield City Council were providing a fair amount of work for foundrymen by reason of the gigantic housing programme they had before them.

The Scientific Era

The toast of "The Institute of British Foundrymen and the Sheffield Branch" was offered by MR. GUY NICHOLSON (general manager and director of the Sheepbridge Coal & Iron Company, Limited), who said it was essential that the foundry industry should keep up to date. The old system of trial and error had of necessity to give way to more modern methods. The necessity for more scientific methods in the foundry trade had been brought about very largely by the universal tendency of the present generation towards increased speed in practically every sphere of life. The tendency towards the use of smaller and less bulky machinery running at higher speeds than formerly was evident on every side. The necessity for the closest co-operation between the chemist and the foundryman was obviously a necessity. The result of such collaboration in recent years had been the development of many iron alloys for foundry purposes, and this had enabled the foundryman not only to maintain markets he was in jeopardy of losing, but in many cases had opened out possibilities for his products in new lines owing to their proved superiority for certain classes of work. In the development of this phase of the industry the Cast Iron Research Association was doing very useful work. It seemed a natural corollary that the Institute of British Foundrymen should provide a channel through which the result of the Cast Iron Research Association's work could be turned to practical account. The enterprise that had been shown in the development of the foundry engineering course at Sheffield University deserved the utmost support from the industry of the district.

The Foundry Degree Course

MR. J. E. HURST (President of the Sheffield Branch of the Institute of British Foundrymen), who presided over the dinner, acknowledged the toast, and in a reference to the firm represented by Mr. Nicholson, said he believed it to be the oldest subscribing firm member of the Institute. The firm had always been strong supporters of the Institute.

Speaking of the Sheffield Branch's activities, Mr. Hurst warmly praised the work of Mr. T. R. Walker, the branch hon. secretary, who, he said, had done virtually the whole of the work of running the Branch. During the year they had had the pleasure of congratulating Mr. Walker on his appointment to the post of Chief Research Chemist to the English Steel Corporation. Even with his added responsibility in this direction, he had undertaken the task of organising secretary for the conference of the Institute to be held at Sheffield in July. He (Mr. Hurst) wished to express publicly his own sense of personal indebtedness to Mr. Walker and the other officers of the Branch for the loyal support they had accorded him.

Referring to the founding course at Sheffield University, Mr. Hurst said its inception was due entirely to the enterprise and knowledge of Prof. Andrew. Under the chairmanship of Mr. V. C. Faulkner the Institute had been able to play an important part in the formation of the degree course by lending its unqualified support and assistance. He believed that this degree course would in time become one of the most important activities with which the Institute had been associated. Foundry students not only from all parts of the country, but from all over the world, now had facilities for specialised training within the walls of Sheffield University. As an Institute, they could pursue no better task than that of continuing to spread abroad the need for further financial support to help to consolidate the work that had been so ably begun. He was sure that the Institute deserved every credit for its association with the degree course.

MR. A. WHITELEY (Senior Vice-President of the Sheffield Branch of the Institute) proposed the toast of the guests.

The Engineer and Unemployment

The MASTER CUTLER (Mr. A. Williamson) replied, and incidentally revealed that he himself had been a patternmaker, having spent just over two years in a patternshop when serving his time as an engineer. Because of this, he said, he thought he could claim to have an intimate knowledge of casting both in iron and in steel. Remarking that the engineer had been blamed for having largely created the present degree of unemployment, he declared such a charge to be unjust. Engineers would not produce machines if they were not wanted. People complained that labour-saving appliances were displacing labour. Were it not for the fact that more modern machines were being produced year by year, there would probably be less employment than there was to-day.

THE FIRST MOTOR CARGO VESSEL built by John Lewis & Sons, Limited, Aberdeen, has been launched from the firm's Torry yard. The vessel, which has been specially designed for the near coasting trade, is 136 ft. in length, with a moulded breadth of 26 ft.

Graphite Electrodes to be made in Sheffield

The electro-metallurgical, electro-chemical and other industries of Great Britain, which have for years been dependent on supplies of graphite and graphite electrodes from outside the country, will be interested to learn that these products will shortly be manufactured in England. A merger has taken place between the Electrode Company of Sheffield, Limited, well-known producers of amorphous carbon electrodes, and the Acheson Graphite Corporation, for years the leading suppliers of graphite electrodes to the British markets, resulting in the formation of British Acheson Electrodes, Limited, which company will manufacture and sell both carbon and graphite electrodes as well as graphite powders.

The company is capitalised at £150,000, all of which has been paid up. The chairman is Mr. C. W. Kayser, chairman of Kayser Ellison & Company, Limited, and previously chairman of the Electrode Company of Sheffield, Limited. The managing director is Mr. Arthur M. Williamson, who has been associated with Acheson interests for many years in America and Europe. Acheson engineers and manufacturing experts are already in Sheffield, and construction and equipment purchases will be commenced at an early date, with the expectation that by the end of the year definite production of graphite will be realised. The amorphous carbon business will also be continued, and alterations are being made in the equipment in line with the latest technique. Mr. P. M. Chetwynd Stapylton, formerly manager of the Electrode Company of Sheffield, Limited, will be in charge of the enlarged facilities at the Wincobank Works, Sheffield, and all of the former staff will be associated with the new enterprise, in collaboration with American experts in the supervision of the process.

The British Acheson Electrodes, Limited, have opened administrative and sales offices at Town Hall Chambers, 87, Fargate, Sheffield, 1.

Fatigue Failure of Metals

At a meeting of the North-East Coast Institution of Engineers and Shipbuilders, held at Newcastle-upon-Tyne recently, a Paper was read on "The Relation of Fatigue to Modern Engine Design." The Paper consisted of three distinct sections, each prepared by a separate author. Part I, by MR. R. A. MACGREGOR, introduced the subject from the point of view of a manufacturer of engine forgings. Part II, by MR. W. S. BURN, dealt specifically with the problems confronting a marine-engine designer. In Part III, by PROF. F. BACON, attempts were made to examine the concrete instances of fatigue failure. It also included reference to certain of the author's experimental investigations not hitherto published.

Utilisation of Low-Grade Ores in Germany

Various researches have recently been carried out in Germany on the utilisation and working up of the low-grade ores found in many parts of the country. Several of the processes tested have proved economical and practical, and include the Krupp continuous reduction process, by means of which the yield from the Lahn and Sieg ores has been very substantially increased. As this process required an increased consumption of coke, means are being sought to obtain a cheap and suitable coke supply. Tests are about to be made with low-temperature coke from the Hessian lignite basin, which if successful would offer a much-needed outlet for some of the central German coke ovens. The most serious difficulty is whether the coke will be cheap enough, as on this the economics of the metallurgical process for treating low-grade ores depend.

Manufacture of Copper Tuyeres and Coolers*

By J. BLAKISTON

Several foundries in the neighbourhood of Middlesbrough are engaged in the manufacture of copper tuyeres and coolers, for which there is a great demand in the blast-furnace industry of the district. The annual output is roughly 500 tons, at a value of approximately £42,000, for local use and export. It is essential that the castings should be perfectly sound to stand test-pressure of 60 lbs. or more without any sign of porosity, and of pure copper for heat conductivity and resistance to abrasion.

This Paper describes briefly the system of manufacture followed in a local foundry, and the following process of manufacture can be adopted to most types of tuyeres and coolers:—

Metal patterns are used whenever the number of castings required justifies them. The mould is rammed in dry sand on a jarring machine, as shown in Figs. 2 and 2A, and a stripping plate is used. The pattern is withdrawn, the mould being placed in the drying stove. The top, shown in Fig. 4, is made from green sand, and is rammed on a pattern plate, and the centre core is made from milled sand in a c.i. core box (Fig. 5). The waterspace core shown in Fig. 6 is the most difficult part to handle, both as regards making and subsequent trouble during casting. The sand must be so rotten as to crush without resistance when the casting is cooling, and yet, on account of the spidery nature of the core, the sand must give sufficient green strength for this core to be handled. There is a very close line between these two properties. The sand used is open coarse-grain silica sand, weakened by the addition of floor sand, and bonded with oil. The feet (*d*) are made of strong milled loam. The number of feet varies according to the weight of the core. Naturally, in large coolers a greater number of feet are used. These feet carry the weight of the core before casting, and the lift of the core after casting.

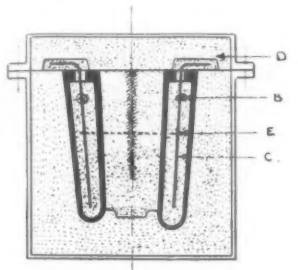

Fig. 1.

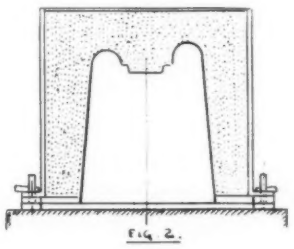
Fig. 2.

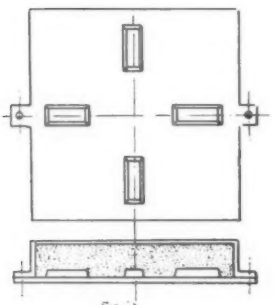
Fig. 4.

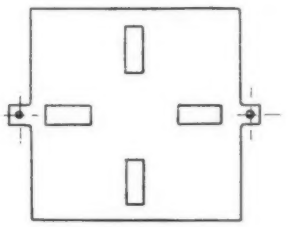
Fig. 3.

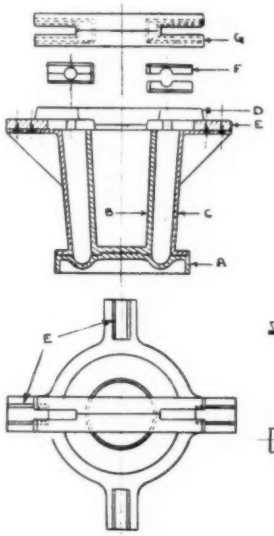

Fig. 6.

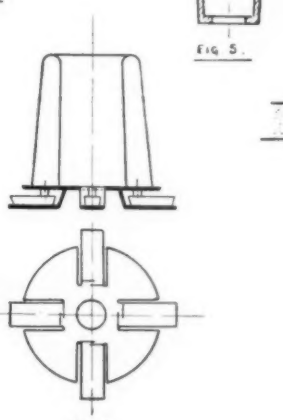
Fig. 7.

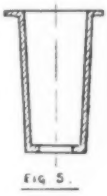
Fig. 5.

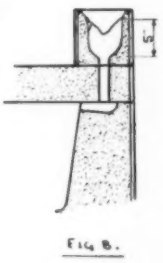
Fig. 8.

The water-jacket core box, shown in Fig. 1, is in three parts: base (*a*), centre part (*b*) and the outside case (*c*). ¼-in. iron bars are placed in the box according to the number of feet, and the sand is rammed to within 5 in. of the top. A piece of 16-gauge wire is placed round the ¼-in. bars (*c*), the sand being rammed to within 1½ in. from the top, and a bed of ½-in. ashes is placed round the core (*d*). The core is then vented to this bed, and the bed is vented in turn through the feet to the green-sand top, by means of ⅛-in. wire. After the sand has been rammed flush with the top of the box, the two pairs of core boxes, shown in Fig. 6 (F), are then placed on top of the centre part (*b*), and the outside case (*c*). These are located by means of split castings (*g*) lined up with lugs (*e*). These castings, which also form the mould for the feet and are made from the stronger milled sand, are then removed, and the sand part of the core box (*b*) withdrawn.

A special plate (Fig. 7) is used to handle the core in the green state. The core is now turned over with this plate and the cover (*a*), and the outer case (*c*) (illustrated in Fig. 6) withdrawn. When the assembling of a tuyere or cooler mould takes place, a 16-SWG template (Fig. 3) is placed over the box, and the position of the feet marked on the sand. The water-jacket core is placed into position, its feet coinciding with the marks. The centre core is then added, the green-sand top placed on and clamped. The tuyere is run with one runner entering the side at the top similar in shape to Fig. 8. The head should be about 5 in. deep.

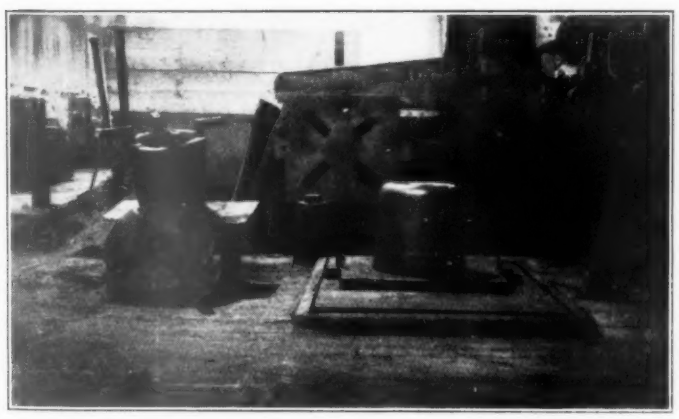

FIG. 2A.—STRIPPING PLATE MACHINE FOR MAKING COPPER TUYERES.

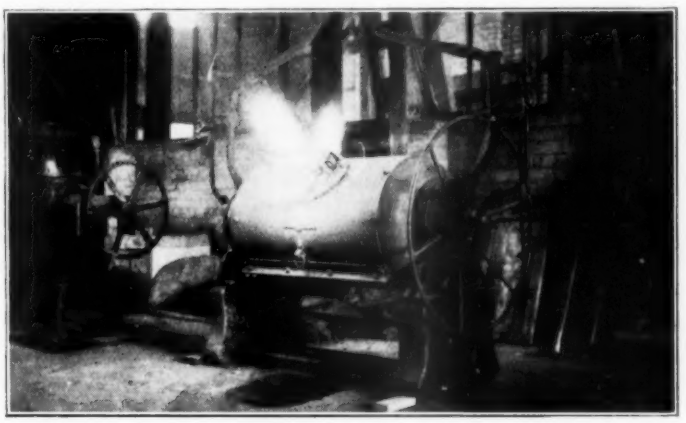

FIG. 9.—OIL-FIRED ROTARY FURNACE FOR METAL MELTING.

Water-Jacket Core Box

The water-jacket core box, shown in Fig. 1, is in three parts: base (*a*), centre part (*b*) and the outside case (*c*). ¼-in. iron bars are placed in the box according to the number of feet, and the sand is rammed to within 5 in. of the top. A piece of 16-gauge wire is placed round

The water-jacket core sand has the following properties:—A.F.A. Standard. *Green state:* moisture content 8 per cent.; permeability 28; strength 4.5 lbs. *Dry state:* permeability 150;

(*Concluded on page* 114)

* Paper read in the Short Paper Competition held by the Middlesbrough Branch of the Institute of British Foundrymen.

XUM

London Iron and Steel Exchange

INDUSTRY'S IMPROVED POSITION

The Rt. Hon. Lord Greenwood, P.C., (Chairman of the Management Committee), presided at the 15th annual dinner of the London Iron and Steel Exchange, which was held at Grosvenor House, London, on Tuesday, January 29. Those present included Sir William Prescott (Chairman, Metropolitan Water Board); Sir James Dunn (Algoma Steelworks, Canada); Sir Harry Peat; Sir Andrew Duncan (Chairman, British Iron and Steel Federation); Sir William Firth; Mr. James Henderson (President, British Iron and Steel Federation); the Right Hon. Sir Edwin Cornwall, Bt., P.C.; the Right Hon. J. C. C. Davidson, P.C., M.P. (Chancellor of the Duchy of Lancaster); Mr. Ernest Brown, M.P. (Secretary for Mines); the Master Cutler of Hallamshire (Mr. Alexander Williamson); Sir Allan Powell; Mr. Benjamin Talbot; Sir Murray Hyslop; Mr. Arthur Dorman; Mr. West Byng; Mr. Percy Donald; Sir John F. Beale; Mr. C. Bruce Gardner; Capt. L. D. Whitehead; Mr. H. Summers; Mr. James Whitby; Mr. J. C. Mahindra (Tata Ironworks, India); Mr. V. C. Faulkner (Editor of the FOUNDRY TRADE JOURNAL), and Mr. H. W. Lockwood (Stewarts and Lloyds, Limited).

MR. ERNEST BROWN (Secretary for Mines) proposing "The London Iron and Steel Exchange" in a speech which was largely jocular in character, remarked that the problems of the iron and steel industry to-day were not very different from what they were many years ago. He recalled from the Parliamentary papers of 1756 a memorandum entitled "The case of the importation of iron and steel from our own Colonies of North America humbly recommended to the consideration of the present Parliament by the iron manufacturers of Great Britain." Continuing, Mr. Brown said the coal industry appreciated that the iron and steel industries were among its best customers, and in the Mines Department they were watching with very great care the progress that was being made in iron and steel. The consumption of coal in that industry had risen from 12 million tons in 1933 to between 17 and 18 million tons in 1934, which was a source of very great satisfaction because the benefits of this increased use of coal were not merely to be measured in terms of increased production of iron and steel; one must also think of the other industrial activities involved and also the effect upon the railway traffic. Finally, Mr. Brown commented on the upward trend in the production of iron and steel and expressed the sincere hope that this would continue and become very much more pronounced.

More Employment

The CHAIRMAN, responding to the toast, said he was very pleased to see such a large gathering of those whom he had met in different walks of life, and to get a closer friendship with those engaged in an industry to which he had recently been promoted. Continuing, the chairman said there could be nothing more gratifying to every one of them than to see the improvement in the heavy industries, which for so long had suffered from great adversity through no fault of their own. It was especially gratifying to know that in those parts of the kingdom where unemployment had been worst, there was now a hope of improvement in employment and an increase in business generally, which was bringing with it relief to those who had been through untold suffering all these years. We had every right to expect greater prosperity than we had experienced for many long years, and those who were connected with the iron and steel industry might feel especially proud to think that the employment figures were increasing and that suffering and adversity were decreasing. It was a great thing to be in an industry which meant so much to men and women and also to feel that they were in a business which appealed to, and could only be worked by, the most virile manhood in their midst. In this connection there was a word of warning he wished to give to some of our enthusiasts. Personally he deplored the efforts being made to move from their native counties and areas men who, for generations, had contributed towards the building up of the iron and steel and coal industries, and the encouragement being given to them to move to southern England, where they were not doing for the State what they would do in reasonable employment in those countries with which for generations they had been connected. Therefore he hoped that the industrial improvement and prosperity would be so pronounced that in all the areas with which the iron and steel and coal industries were connected as producers, at any rate, it would be possible to absorb the unemployed in those industries. As a champion of the heavy industries into which he had come, the chairman said he would continue his work in them with the feeling of pride that no one served his country more than he who helped to increase its employment.

MR. JAMES WHITBY (chairman of the Directors of the Exchange) proposed "The Guests," and coupled with the toast the names of Mr. Alexander Williamson (the Master Cutler of Hallamshire) and Sir William Prescott (chairman of the Metropolitan Water Board).

Expenditure on Plant

MR. ALEXANDER WILLIAMSON, who made the first response to the toast, said that in his personal and also his representative capacity he was gratified at being able to bring a message of encouragement as to the progress that was being made towards prosperity in one at least of the most important industrial areas of the country. Sheffield in the year that had just passed had established a record volume of production in its industrial history, and he was glad to add that while Sheffield, perhaps, had been more fortunate than many areas, he could in his personal capacity claim to represent, in some measure, the iron and steel industry in general. In Sheffield they had been spending money and in doing so had looked to the future progress of the steel industry, thus in one of the large steelworks there had recently been installed the most modern steel-melting plant that existed anywhere in the world. It was indeed a very great satisfaction to him, continued Mr. Williamson, to be able to draw from the experience of the past year in the iron and steel industry great encouragement as to the progress being made towards economic recovery, not only in this country but throughout the world, because it was not unreasonable to consider that great basic industry a representative index of economic conditions. In this country they had increased the production of steel in 1934 by 30 per cent. over the year 1933 and by 70 per cent. over 1932. If they considered the world's figures, the production of steel in the world in 1929—which was a world's record year—reached 118 million tons, but this fell to some 50 million tons in 1932, rising again in 1933 to 65 million tons and to 80 million tons in 1934, or a 20 per cent. increase—a very remarkable advance. This year, as far as they had gone, in Sheffield they had within the past week benefited by a very large order for railway material from one of the European countries which would keep busy for a few months, and would give a satisfactory return to, those firms who had been fortunate enough to secure this order for the production of solid wheels, tyres and axles for railways. Those were indications that a good measure of orders was evolving out of the chaos of the post-war period, and personally he felt that they could look forward to a period perhaps of difficulty but certainly of slow, yet certain, progress.

SIR WILLIAM PRESCOTT (Chairman, Metropolitan Water Board) said he always read very carefully the annual reviews of the trade position by the chairmen of our big joint stock banks, and there had been several of these recently. Reading these reports he had felt a great satisfaction that the chairmen of the banks without exception made very encouraging statements indeed with regard to the revival of the iron and steel industries and also the great engineering and shipbuilding industries. These industries had been through a period of great adversity and speaking personally he was delighted to realise that the flood tide of prosperity was now well on its way and that these industries should find the prosperity which they so thoroughly deserved.

The final toast—"The Chairman"—was proposed by the RT. HON. J. C. C. DAVIDSON, P.C., M.P. The CHAIRMAN briefly acknowledged the toast.

Copper as an Alloying Element in Steel

H. L. MILLER, in "Metals and Alloys," points out that copper in steel increases the strength of the ferrite and produces a normalised steel of constant yield point after varying cooling rates; while copper and molybdenum together in steel provide a high resistance to the flaking of oxide films formed on exposure to industrial atmospheres. The hot-shortness produced by copper can be reduced by addition of nickel or molybdenum or of both, but such steels develop a sticky oxide surface during hot-rolling; Cr-Mn-Cu steels are free from both defects.

Manufacture of Copper Tuyeres and Coolers

(*Concluded from page* 113)

strength 40 lbs. per sq. in. The copper for these castings may be melted in either crucibles and pit fires or oil-fired open-flame rotary furnaces, but gas-fired or oil-fired crucible furnaces cannot be used. The metal is withdrawn from the furnaces at a temperature of 1,200 deg. C., and cast at 1,190 deg. C. These temperatures must be strictly adhered to, as the slightest variation will result in an unsound casting. If pit fires are used, the following charges are made, using phosphor-tin and copper as deoxidisers:—112 lbs. of electrolytic copper; 1 lb. 6½ oz. of 5 per cent. phosphor-tin; 4½ oz. of 15 per cent. phosphor-copper. This mixture is used for new tuyeres, and when these are returned they are added in the proportion of two-thirds scrap to one-third of the new mixture. The phosphor-tin and copper are added after the pot is withdrawn from the fire, the metal being covered with charcoal. When they have been well stirred the tuyeres are poured as quickly as possible. After casting, the clamps on the boxes are tightened, and feeding is accomplished by tapping the git box lightly with a hand-hammer for about 5 min. About 5 lbs. of metal will feed into the casting from the head, using this method.

Open-Flame Furnace

This method of melting illustrated gives a sounder and heavier casting. Only one casting must be attempted at one time from the furnace, as the temperature line of demarcation is too close to achieve a second pour at the correct temperature. Phosphorus is not used as a deoxidiser in the case of open-flame furnaces. A neutral flame is used and the bath is covered with anthracite coal. When the metal has melted, 2 lbs. of 15 per cent. silicon-copper is added. It is essential that the furnace should be worked by the clock, as it takes approximately 24 min. for the melt.

As for machining, the turning of these castings is done on a round-about lathe, using two tools at once. One tool cuts the chamfer, while the other cuts the mitre. The castings are placed on a turntable on the drilling machine, which can be tilted to any required angle. All the holes are drilled without altering the first setting. These holes are then followed up with a Pearn Automatic Tapper. The castings are now ready for testing and subsequent despatch.

Fracture of Iron Castings

Discussing the hot fracture of iron castings in "Revue Métall.," L. GASQUARD points out that fractures in iron castings while in the mould are due to incorrect adjustment of the thicknesses of the various parts and the contraction which occurs at the moment of solidification. Unequal rates of cooling may be prevented in various ways.

Mexican Industry

The Mexican Government publishes monthly or fortnightly, under the auspices of the Ministry of External Affairs, a bulletin of some 64 pages, of which about 40 pages are devoted to articles written by Mexican consular officers abroad, dealing with machinery, etc., which is likely to be of interest to Mexican industry. The Department of Overseas Trade has ascertained that the Mexican Consul-General in the United Kingdom, whose address is 8, Halkin Street, London, S.W.1, is prepared to receive articles describing British products, accompanied by appropriate illustrations (in triplicate), from United Kingdom manufacturers of machinery, which he is prepared to translate into Spanish and to forward to Mexico. Catalogues are regarded as being unsuitable for the purpose, but copies of Press material prepared for similar use in British technical or general periodicals would be appreciated. A copy of the Commercial Bulletin is available for loan on application to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1, by quoting reference D.O.T. 27766/34. It may be mentioned that the Commercial Bulletin does not carry advertisements.

XUM

TEISEN
ENAMELLING MUFFLES

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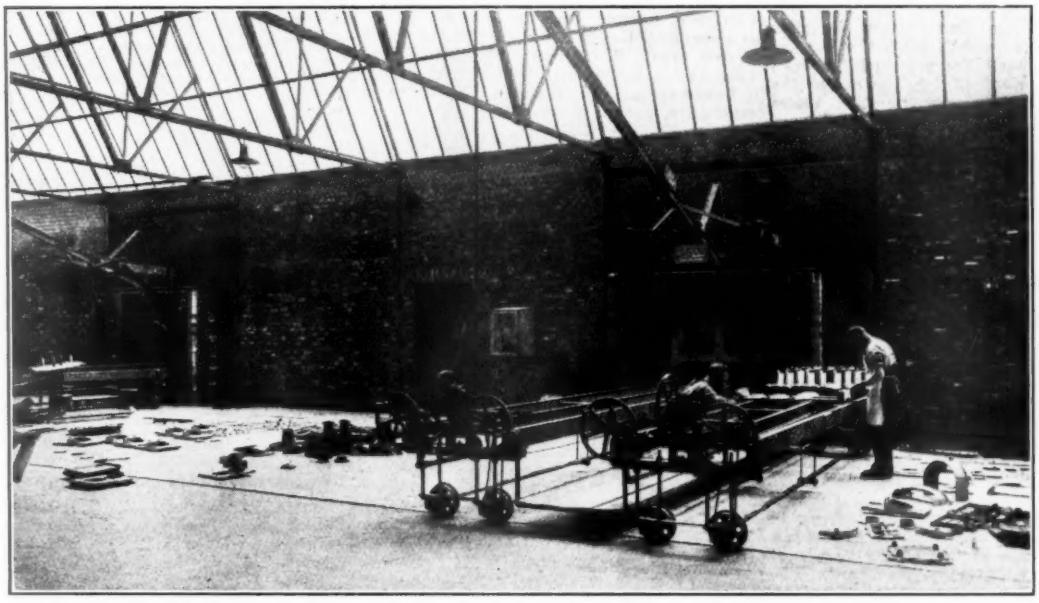
ROTARY MELTING FURNACES WORKS PLANNED



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S3/F.T.J.

This Week's News in Brief

Trade Talk

THE MACHINERY for the new boot factory which opens at Clonmel, Irish Free State, this week, has been supplied by the Singer Machine Company, Clydebank.

WORLD COPPER PRODUCTION in 1934 has been estimated at 1,140,000 tons, or 12 per cent. higher than in 1933. Consumption was calculated at 1,320,000 tons, as against 1,100,000 tons in 1933.

THE PHŒNIX WORKS, Stockton-on-Tees, of Messrs. Worth, Mackenzie & Company, Limited, have been purchased by Messrs. Hughes, Bolckow & Company, Limited, shipbreakers, of Blyth. The works comprise a foundry, a pump-manufacturing department, and an engineering shop.

THE NORTH BRITISH LOCOMOTIVE COMPANY, LIMITED, Springburn, Glasgow, have secured a contract for twenty locomotives from the L.N.E. Railway Company. This will make a valuable addition to the work on hand by the Glasgow firm, who will soon be completing an order of 50 locomotives for South Africa, and have also on hand an order for six locomotives for Palestine.

FOLLOWING DEVELOPMENTS in the Italian chemical industry, Government approval has now been given for further extensions in the metallurgical industry. The Falk concern are to erect three new electric furnaces for steelmaking from purple ore, and works at Genoa are to be extended for the manufacture of bronze, brass and aluminium castings, small metal articles and bicycles.

FURTHER STEPS have been taken to develop the iron and steel industry in Rumania. The composite works of the Titan-Nadrag-Calan concern at Galatz are to be considerably expanded, while the foundry cartel embracing nearly all the principal foundries in the country has been extended to the end of the current year. At the cartel's recent meeting, prices and sales arrangements were left temporarily unchanged.

SUBJECT TO THE SETTLEMENT of certain details, the Admiralty has decided to entrust the following contracts (1934 programme) to the firms indicated :—Hull and machinery of H.M. submarine "Spearfish," to Messrs. Cammell, Laird & Company, Limited, Birkenhead; machinery for H.M.S. "Aurora" to the Wallsend Slipway & Engineering Company, Limited, Wallsend. H.M.S. "Aurora," a cruiser, is to be constructed at Portsmouth.

IT IS ANNOUNCED by the committee promoting the scheme to restart Messrs. Palmer's iron and steel works at Jarrow, and the Tyne Improvement Commission (which is supporting the proposal), that plans for restarting the works are proceeding in a satisfactory way. The statement says that it is proposed to start up the Jarrow plant on the basis of 100,000 tons of steel per annum, but including a greater and more diversified range of products.

ORDERS FOR THREE large oil tankers have been placed with two Clyde firms by the Anglo-Saxon Petroleum Company, Limited. Messrs. Harland & Wolff, Limited, are to build two of the vessels of 9,250 tons displacement at their Govan yard. The third vessel, which will be of 12,100 tons displacement, is to be built by the Blythswood Shipbuilding Company, Limited, at the Scotstoun yard. The vessels will be propelled by supercharged Diesel engines.

AT AN EXTRAORDINARY MEETING of Murex, Limited, recently, proposals for the capitalisation of £270,000, part of the general reserve fund, and the issue of a bonus of one fully-paid ordinary share of 10s. for every ordinary share held, were unanimously approved. Resolutions were also approved providing for the consolidation of each two ordinary shares of 10s. into one ordinary share of £1, and amending the articles in relation to directors' remuneration.

CAPTAIN NORMAN A. DORE presided at the annual general meeting of the Royal Metal Trades' Pension and Benevolent Society, held at the offices, 61, Knightrider Street, London, E.C.4, on Wednesday, January 30. At the election which followed 16 men and four women were admitted as pensioners. Colonel H. W. O'Brien, having resigned the position of chairman, Captain Norman A. Dore (Messrs. Baldwins, Limited) was unanimously elected chairman of the board and Mr. Edgar E. Starke was elected vice-chairman.

EXTENSIONS ARE BEING carried out and new plant installed at the Aluminium Works at Burntisland to meet a growing demand for alumina, a white powder obtained by a chemical process from the mineral bauxite-ore, which is used in the manufacture of aluminium. Hitherto the by-product, bauxite residue, has been used to a small extent for the painting of the underside of linoleum, but as the result of research this residue is in much demand in the manufacture of paint suitable for coarse ironwork.

A TRIBUTE TO THE INTRODUCTION of tariffs, which, he said, had given stability and security to the heavy industries, was made by Mr. E. J. George, managing director of the Consett Iron Company, Limited, speaking at a dinner of the Consett and District Chamber of Commerce. Mr. George said that, with tariffs and the company's reconstruction scheme, things were much brighter for the Consett Iron Company. Although some people had criticised their reconstruction scheme when they embarked on it some years ago, it had enabled them to carry on in face of keen competition during the worst period experienced.

Contracts Open

Cardiff, February 13.—100 lamp pillars, for the Town Council. Mr. G. H. Whitaker, city engineer, City Hall.

London, February 15.—The Gaekwar's Baroda State Railways invite tenders for locomotives, 4-6-0 type, metre gauge. Messrs. Rendel, Palmer & Tritton, 55, Broadway, Westminster, S.W.1. (Fee 10s. 6d., non-returnable.)

London, February 20.—The Assam-Bengal Railway Company, Limited, invite tenders for six locomotive engines and tenders. I.R.S. "YK" 2-6-0 superheated type. The Offices, 80, Bishopsgate, E.C.2. (Fee £1 1s., non-returnable.)

Avonmouth, March 18.—Electrical pumping machinery, for the Port of Bristol Authority, Royal Edward Dock, Avonmouth. Mr. W. P. Wordsworth, chief engineer, Chief Engineer's Office, Avonmouth Dock. (Fee £3, returnable.)

Holme, February 25.—37¼ miles of spun- and cast-iron pipes, 5 in. to 2 in. dia., etc., for the Wigton Rural District Council. Messrs. J. J. Davison & Partners, civil engineers, 6, King Street, Wigton, Cumberland. (Fee £3 3s., returnable.)

Keighley, February 12.—1,950 yds. of 6-in. dia. and 1,400 yds. of 3-in. dia. spun cast-iron pipe, with specials, valves and fittings, for the Rural District Council. Mr. A. Brooksbank, 14, The Exchange, Bradford, Yorkshire. (Fee £1 1s., returnable.)

Cairo, March 25.—Diesel pumping station, for the Egyptian Government. Mechanical and Electrical Department, Ministry of Public Works. The Chief Inspecting Engineer, Egyptian Government, 41, Tothill Street, London, S.W.1. (Fee £1 0s. 6d., not returnable.)

Mouldsworth, March 18.—Rotary deep borehole pump (capacity 125,000 galls. per hr., total lift about 700 ft.), electric motor and transformer, overhead crane, and all accessories, for the West Cheshire Water Board. Messrs. G. H. Hill & Sons (Manchester), 40, Kennedy Street, Manchester. (Fee £5 5s., returnable.)

Testing of Welds

At a meeting in Glasgow of the Society of Consulting Marine Engineers and Ship Surveyors, Dr. J. E. Paterson read a Paper on "The Commercial Testing of Welded Structures and Welds." Dr. Paterson pointed out that it was comparatively simple to test by the ordinary equipment of a test house the materials from which the welds were made, but on the completed structures there were no tests possible of the same type. The only method to ensure sound workmanship was to have a definite procedure and supervision of a sufficiently good character to make certain that the instructions on the drawings were properly carried out. In illustration of his remarks, the lecturer showed a film of the recently-completed Bank of England, the steel work of which was supplied and erected by Colvilles, Limited, and welded with Murex electrode. Mr. McBride, managing director of Colville Construction Company, Limited, described the erection of the structure, whilst Mr. J. Darlington, who was foreman welder on the job, explained the procedure adopted and the methods of testing used in order to ensure sound workmanship.

Personal

MR. G. H. HOLDING has been appointed London manager of Messrs. Newman, Sons & Company, Limited, engineers, of Bristol.

MR. W. LUND, a works manager at the Middle Docks, South Shields, has been appointed manager to Messrs. E. H. Williamson & Company, Limited, engineers and ship repairers, Liverpool.

MR. C. E. WHITEHEAD, manager of Devonshire Works, Staveley, of the Staveley Coal & Iron Company, Limited, Mr. A. Symonds, works engineer, and Major R. G. Marten, export trade manager, are undertaking a business tour of Scandinavia.

Wills

HAWKINS, F. T., proprietor of Messrs. Hawkins & Company, ironfounders, of Tipton £40,380

BERRY, J. F., of Lightcliffe, Yorks, and the Bank Foundry, Halifax, engineer and ironfounder £18,087

Obituary

MR. ALBERT MOORE, of Messrs. Henry Moore (Castors), Limited, brass and iron founders, of Birmingham, has died, in his 69th year.

MR. EDWARD BAINES HORSFIELD, of Horbury, who has died at the age of 53 years, was formerly deputy managing director, under his father, of the Horbury Junction Iron Company, Limited, until the works closed down, when he retired from business.

New Companies

(From the Register compiled by Jordan & Sons, Limited, Company Registration Agents, 116 to 118, Chancery Lane, London, W.C.2.)

City Tool & Engineering Company, Limited.—Capital £100. Directors: W. H. Rigg, Addington House, Redington Road, London, N.W.3; J. G. Martin.

Zinchroid Die Casting Company, Limited, 45, Great Hampton Street, Birmingham.—Nominal capital: £1,000 in £1 shares. To carry on the business of iron and brass founders, etc. Directors: S. S. Walters, "Wendover," Harman Drive, N.W.2 (managing director); E. Round, 278, Aston Lane, Witton, Birmingham.

Crown Castings, Limited, 100, Victoria Street, S.W.1.—Nominal capital £100 in £1 shares. To carry on the business of manufacturers and marketers of castings of all kinds, etc. Directors: A. C. Combe, "Amulree," Eyhurst Close, Kingswood, Surrey; H. J. A. Johnson, Olden Cottage, Olden Lane, Purley.

Applications for Trade Marks

The following list of applications to register trade marks has been taken from the "Trade Marks Journal" :—

"CRITON."—Pumps. Pulsometer Engineering Company, Limited, Nine Elms Ironworks, Oxford Road, Reading.

"SHADRACH." — Heat-resisting steel. Head, Wrightson & Company, Limited, Teesdale Iron Works, Thornaby-on-Tees.

"ABEDNEGO."—All goods included in Class 5. Head, Wrightson & Company, Limited, Teesdale Iron Works, Thornaby-on-Tees.

A SHEEP ON A BRIDGE AND THE WORD "STOKES."—Metal castings in the rough. Sheepbridge Stokes Centrifugal Castings Company, Limited, Sheepbridge Works, Chesterfield.

Forthcoming Events

The Institute of British Foundrymen

FEBRUARY 8.

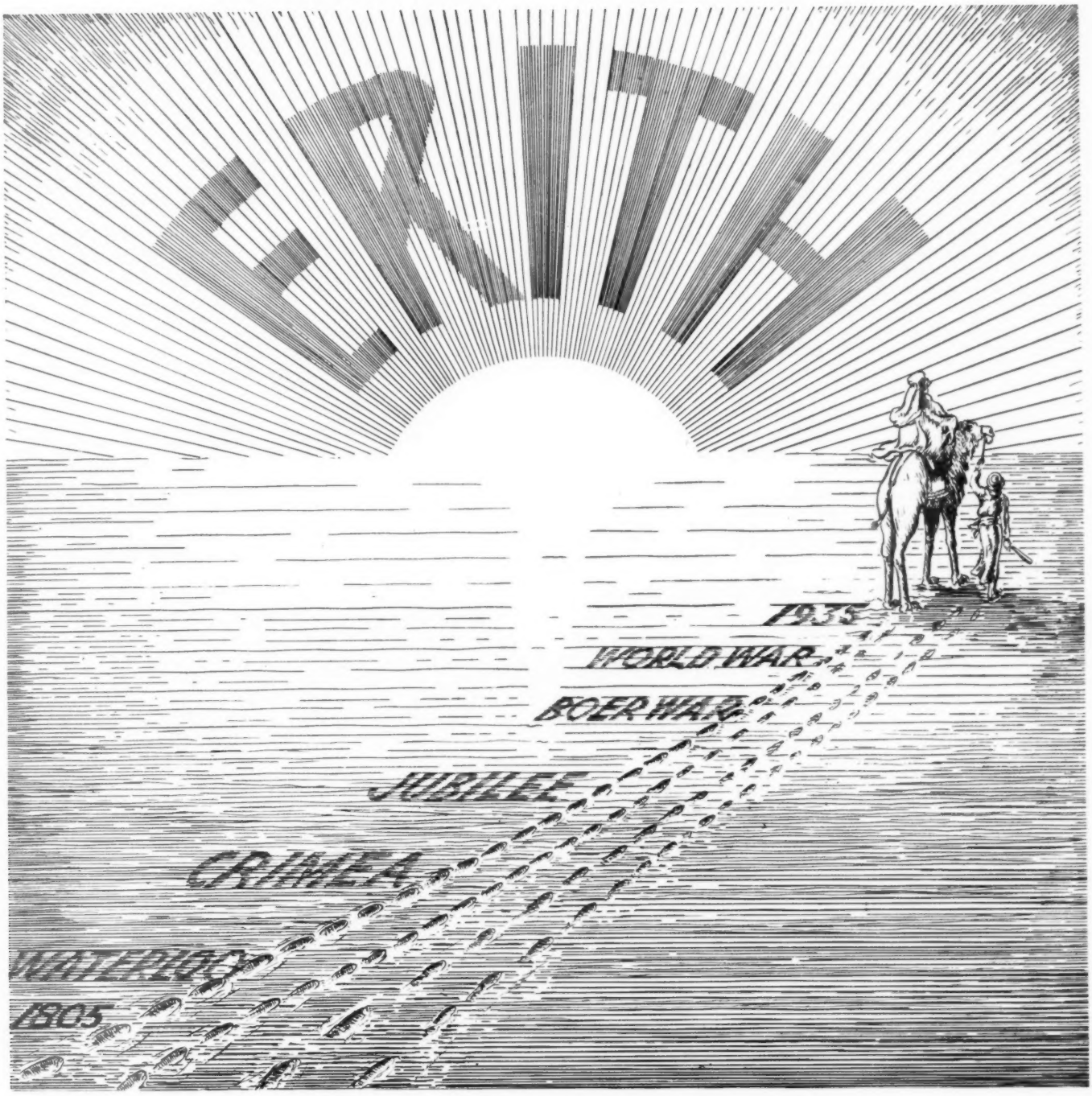
Middlesbrough Branch :—"Ingot Moulds, Bottoms and Slag Ladles," Paper by J. Blakiston, A.I.Mech.E., at the Cleveland Scientific and Technical Institute, Corporation Road, Middlesbrough, at 7.45 p.m.

FEBRUARY 9.

Scottish Branch :—"Patternmaking," Paper by A. Marshall, at the Royal Technical College, George Street, Glasgow, at 4 p.m.

West Riding of Yorkshire Branch :—Visit to works of John Fowler (Leeds), Limited.

SONGS OF THE SAND



"FOOTPRINTS IN THE SANDS OF TIME"

Erith Loam Marketed in Five Grades

MILD, MEDIUM, YELLOW, STRONG, EXTRA STRONG and **WHITE SILICA** for Oil Cores

Samples on application to:

J. PARISH & CO., LOAM QUARRIES, ERITH, KENT

Raw Material Markets

Activity is gradually returning to the iron and steel markets, although somewhat tardily. Fortunately, the limited volume of current sales is not a true indication of the state of trade, as most of the large consumers took the precaution of covering their winter requirements some time ago.

Pig-Iron

MIDDLESBROUGH.—Business is becoming distinctly more lively in the Cleveland pig-iron market. Heavy deliveries against existing contracts are being supplemented by a steady volume of day-to-day sales. Shipments to Scotland are now back to their normal level, whilst the outlook at the local heavy foundries has distinctly improved as the result of substantial orders for railway material. Home prices are still stabilised on the basis of 67s. 6d. per ton for No. 3 Cleveland G.M.B. delivered to local consumers, 69s. 6d. per ton delivered on the North-East Coast, 67s. 3d. delivered Falkirk and 70s. 3d. delivered Glasgow. No. 1 foundry grade remains at a premium of 2s. 6d. per ton over No. 3, whilst 1s. per ton discount is allowed on No. 4 foundry and No. 4 forge iron.

The output of East Coast hematite is already largely sold until the end of March, and sales are now taking place for the succeeding three months. East Coast prices still compare favourably with those quoted by West Coast competitors, and business is being done on the basis of 69s. per ton for No. 1 grade delivered Middlesbrough, 71s. delivered North-East Coast, 75s. delivered Scotland, 76s. delivered Lancashire and 79s. delivered Birmingham.

LANCASHIRE.—Deliveries of pig-iron to light-castings foundries in this area are limited, as is usual at this season, but to other consumers deliveries are maintained at a satisfactory level. There has been little change in the general price situation in this section. For delivery to foundries in the Lancashire zone, offers of Derbyshire and Staffordshire brands of No. 3 iron are all quoted at 74s. per ton, with Northamptonshire at 72s. 6d., Derbyshire forge iron at 69s., Scottish No. 3 at around 82s. 6d., East Coast hematite at from 75s. to 76s., according to quality, and West Coast at up to 78s. 6d.

MIDLANDS.—There has been a slight recovery of activity in the Midlands light-castings trade, and the general opinion is that the present slackness will not last much longer. The present controlled prices delivered Birmingham and Black Country stations are 67s. 6d. per ton for Northants No. 3 and 71s. per ton for Derbyshire, Lincolnshire and North Staffordshire No. 3, these figures being subject to a small rebate to large consumers. Prices for the better qualities vary to a considerable degree, the figures depending to a large extent on the analysis and tonnage involved. The prices for the medium-phosphorus irons range from 72s. to 80s., low-phosphorus 85s. to 87s. 6d., and refined iron from £5 7s. 6d. to £6 10s. per ton, delivered this area. In regard to hematite, there is no weakness in prices, the controlled rates delivered this area being £3 18s. for East Coast and Welsh and £4 4s. 6d. for West Coast hematite.

SCOTLAND.—Trading in pig-iron on the Glasgow market still tends to be sluggish, but there are no alterations in prices to report. The official minimum of 70s. for Scottish No. 3 foundry at furnaces still holds good, with 2s. 6d. per ton additional for No. 1. No. 3 Cleveland iron is at 67s. 3d. f.o.t. Falkirk and 70s. 3d. f.o.t. Glasgow, with other English foundry irons offering at 1s. 3d. per ton below these figures.

Coke

The demand for cupola coke is showing signs of expansion as the rate of activity increases at the foundries. As many of the latter are covered at the old rates until the end of June, new business is necessarily limited. Quotations for delivery in the Birmingham area are as follow:—Best Durham coke, 36s. to 40s.; Welsh, 35s. to 45s. per ton.

Steel

Steady but rather quiet conditions have ruled in the steel markets during the past week, but there are indications that the lull is of a temporary character. The early spring demand is already beginning to make itself felt, and this should shortly be reflected in heavier deliveries to many of the consuming industries. In the semi-finished steel department the demand has improved, and little Continental competition is now experienced, as the application for higher duties has resulted in buyers adopting a cautious attitude. The British steelworks producing this class of material are well off for orders and their output is steadily passing into consumption. Business in the finished-steel department has increased somewhat in volume, although it is spread rather unevenly over the market. The home trade demand is gradually expanding and export business also has been brighter.

Scrap

Scrap-iron prices are generally firm. In the Cleveland district there is an active demand for good machinery metal and prices ranging from 53s. 6d. to 54s. per ton have been realised, whilst foundry cast-iron scrap is selling freely at 52s. 6d. to 53s. per ton. In the Midlands, heavy machinery metal is now at 55s. to 56s., good heavy at 50s. to 51s. 6d. and clean light at 47s. 6d., all delivered works. There is only a limited call for cast-iron scrap in South Wales, quotations being 50s. to 52s. 6d. for heavy metal, 40s. to 42s. for light cast-iron scrap, and 55s. for good cast-iron machinery scrap. In the Scottish market, heavy machinery cast-iron scrap is still being taken up at 55s. to 56s., whilst for ordinary foundry cast iron 51s. 6d. to 52s. 6d. is being paid.

Metals

Copper.—There is a feeling of uncertainty in the copper market, partly contributed to by the postponement of the American Supreme Court's decision on the gold clause, which is now to be announced on Monday. Buyers have taken up a rather reserved attitude, and the general demand has not been of very large extent.

"Consumption in this country is well maintained and, generally speaking, there would seem to be indication of improvement in this direction, more favourable reports being received both from America and the Continent. Negotiations are said to be in progress with regard to the limitation of output, but nothing very definite in this respect has so far been reported. It seems to be generally assumed, however, that some time must elapse before arrangements can be completed," report Messrs. Rudolf Wolff & Company.

Daily quotations :—

Cash.—Thursday, £27 11s. 3d. to £27 12s. 6d.; Friday, £27 15s. to £27 16s. 3d.; Monday, £27 11s. 3d. to £27 12s. 6d.; Tuesday, £27 5s. to £27 6s. 3d.; Wednesday, £27 2s. 6d. to £27 3s. 9d.

Three Months.—Thursday, £27 17s. 6d. to £28; Friday, £28 to £28 1s. 3d.; Monday, £27 17s. 6d. to £27 18s. 9d.; Tuesday, £27 10s. to £27 11s. 3d.; Wednesday, £27 7s. 6d. to £27 8s. 9d.

Tin.—According to statistics prepared by W. H. Gartsen, total visible supplies of tin at the end of January amounted to 17,122 tons—15 tons more than at the end of December. With the exception of Holland, deliveries of tin in Europe were generally lower in January than in December, and in this country alone showed a decrease from 1,413 tons (December) to 997 tons (January).

Dealing in tin on the London Metal Exchange has been made very difficult by the fact that "near-date" metal is almost unobtainable. A "backwardation" of about £5 has existed between prices of spot and three months' metal.

Market fluctuations :—

Cash.—Thursday, £233 15s. to £234; Friday, £233 15s. to £234; Monday, £233 10s. to £233 12s. 6d.; Tuesday, £233 to £233 5s.; Wednesday, £232 15s. to £233.

Three Months.—Thursday, £228 17s. 6d. to £229; Friday, £228 17s. 6d. to £229; Monday, £228 17s. 6d. to £229; Tuesday, £228 17s. 6d. to £229; Wednesday, £228 17s. 6d. to £229.

Spelter.—The possibility of a revision being made of the import duty on foreign spelter (and, incidentally, on foreign lead) tends to disturb the forward market in this metal. There is, nevertheless, quite a good current demand from the consuming industries in this country, which are fairly well occupied.

Official quotations :—

Ordinary.—Thursday, £12 2s. 6d.; Friday, £11 15s.; Monday, £11 16s. 3d.; Tuesday, £11 16s. 3d.; Wednesday, £11 15s.

Lead.—The lead market has been weaker since the beginning of the month.

"Activity in the cable industry, particularly in this country, is well maintained. In America, however, the market has been easier and the price has been reduced by 10 points, to 3.60 cents per lb.," report Messrs. Brandeis, Goldschmidt.

Day-to-day prices :—

Soft Foreign (Prompt).—Thursday, £10 8s. 9d.; Friday, £10 2s. 6d.; Monday, £10 3s. 9d.; Tuesday, £10 1s. 3d.; Wednesday, £10 1s. 3d.

Retirement of Foundry Receptionist

Miss E. L. Thompson, the official receptionist at the Soho Foundry of Messrs. W. & T. Avery, Limited, is retiring after twenty-four years of service. When in January, 1911, Miss Thompson first commenced her work there was a very small waiting-room only, fitted with leather-covered benches. Inquiries were made through a tiny trap-door in the wall. To-day the Avery reception-room is a hall situated at the entrance to the works.

At the outbreak of war in 1914 Miss Thompson had strict instructions that on no account was she to allow any unauthorised person to pass into the works. Accordingly, from that time onwards, a complete register has been kept of every person visiting Soho Foundry. During 1934 there were 9,216 visitors.

Many notable people from all parts of the world have been received by Miss Thompson and have signed the official visitors' book. Among these have been the Duke of York and M. Stabuliski (Prime Minister of Bulgaria), who was shortly afterwards to meet his death following a plot to establish himself as President. Delegations have also been received from Cuba, Japan, U.S.A., South Africa, Switzerland, Tasmania and Turkey. Facilities are given for parties of school children to visit the works, and the children often address the receptionist as "Mrs. Avery."

Patent Specifications Accepted

The following list of Patent Specifications accepted has been taken from the "Official Journal (Patents)." Printed copies of the full Specifications are obtainable from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 1s. each. The numbers given are those under which the Specifications will be printed and abridged, and all subsequent proceedings will be taken.

419,680. ELECTRO METALLURGICAL COMPANY. Iron-chromium alloys.

419,744. SIEMENS & HALSKE AKT.-GES. Material, and bodies formed therefrom, for the polishing, smoothing, and grinding of very hard objects, particularly hard alloys.

419,832. ELECTRIC FURNACE COMPANY. Heat-treatment of metals.

419,953. TELEGRAPH CONSTRUCTION & MAINTENANCE COMPANY, LIMITED, GARNETT, H. J., and SMITH, F. H. Manufacture of nickel-iron alloys.

419,996. BRITISH THOMSON-HOUSTON COMPANY, LIMITED. Electrical control systems for rolling mills.

420,008. WELDING SERVICE, INC. Processes and apparatus for hardening rails.

420,036. BARON, H. (Alfina Immobilien-Finanzierungs und Verwaltungs Akt.-Ges.). Method of and apparatus for the manufacture of seamless pipes.

420,077. WILSON, P. H., RIDLEY, W., and STANTON IRONWORKS COMPANY, LIMITED. Pipe joints.

420,100. BRITISH THOMSON-HOUSTON COMPANY, LIMITED, and KNIGHT, H. DE B. Systems of electric welding.

XUM

This ring casting in an aluminium alloy, by Messrs. William Mills, Ltd., Birmingham, measures 6′ 1″ in diameter and weighs approximately 3 cwt.

If you are interested in aluminium alloys, we invite your enquiries.

ALUMINIUM

The BRITISH ALUMINIUM CO. *Ltd.*

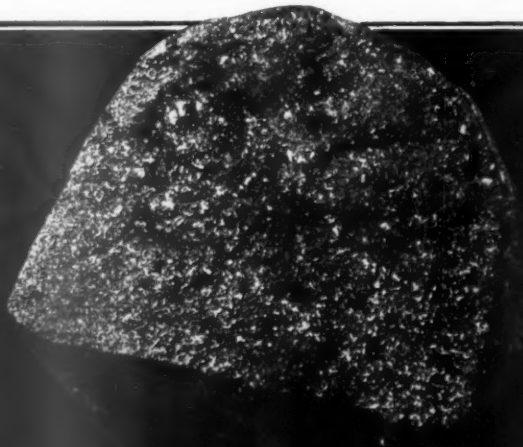
HEAD OFFICE: ADELAIDE HOUSE, KING WILLIAM ST., LONDON, E.C.4.
TELEPHONE: MANSION HOUSE 5561 & 8074 (5 LINES) TELEGRAMS: CRYOLITE, BILGATE, LONDON.

LONDON WAREHOUSE: 25-29, Pancras Road, N.W.1. BIRMINGHAM, 4: 2, Lawley Street. MANCHESTER: 274, Deansgate. LEEDS, 3: 66, Kirkstall Road. NEWCASTLE-ON-TYNE, 1: Milburn House. GLASGOW, C2: 113, West Regent St.

The BRITISH ALUMINIUM COMPANY *Ltd.*

F.T.J. 7.2.35

DORMAN LONG



Manufacturers of FOUNDRY, BASIC and HEMATITE qualities. Delivery from stock. Booklet giving analyses, etc., will be sent on request.

DORMAN LONG & CO. LTD., MIDDLESBROUGH

AGENTS IN SCOTLAND:
MESSRS. J. & A. McMORLAND,
40 ST. ENOCH SQUARE, GLASGOW

PIG IRON

RAW MATERIALS—PRICE LIST

(Wednesday, February 6, 1935)

COPPER

	£	s.	d.
Standard cash	27	2	6
Three months	27	7	6
Electrolytic	30	5	0
Tough	29	0	0
Best selected	29	10	0
Sheets	58	0	0
India	40	15	0
Wire bars	30	15	0
Ingot bars	30	15	0
H.C. wire rods	33	10	0
Off. av. cash, January	28	2	2 1/4
Do., 3 mths., January	28	9	5 1/2
Do., Sttlmnt., January	28	2	4 7/11
Do., Electro, January	31	9	1 1/11
Do., B.S., January	31	2	6
Do., wire bars, January	31	12	11 5/11
Solid drawn tubes			9 1/2d.
Brazed tubes			9 1/2d.
Wire			6d.

BRASS

Solid drawn tubes	8 3/4d.
Brazed tubes	10 3/4d.
Rods, drawn	8d.
Rods, extd. or rlld.	4 1/4d.
Sheets to 10 w.g.	7 1/8d.
Wire	7d.
Rolled metal	6 5/8d.
Yellow metal rods	4 1/2d.
Do. 4 × 4 Squares	5 1/2d.
Do. 4 × 3 Sheets	5 1/2d.

TIN

	£	s.	d.
Standard cash	232	15	0
Three months	228	17	6
English	233	0	0
Bars	235	0	0
Straits (nom.)	233	0	0
Australian (nom.)			—
Eastern			—
Banca (nom.)	236	5	0
Off. av. cash, January	231	6	0 3/11
Do., 3 mths., January	228	16	9 10/11
Do., Sttlmt., January	231	6	4 4/11

SPELTER

	£	s.	d.
Ordinary	11	15	0
Remelted	13	2	6
Hard	10	10	0
Electro 99.9	14	7	6
English	12	18	9
India	12	2	6
Zinc dust	17	0	0
Zinc ashes	3	0	0
Off. aver., January	12	2	0 9/44
Aver. spot, January	11	19	10 7/11

LEAD

	£	s.	d.
Soft foreign ppt.	10	1	3
Empire (nom.)	11	3	9
English	12	5	0
Off. average, January	10	8	4 5/22
Average spot, January	10	6	5 2/22

ALUMINIUM

Ingots	£100 to £105
Wire	1/1 to 1/9 lb.
Sheet and foil	1/2 to 2/9 lb.

ZINC SHEETS, &c.

	£	s.	d.
Zinc sheets, English	23	10	0
Do., V.M. ex-whse.	22	12	6
Rods	26	10	0

ANTIMONY

	£	s.	d.		£	s.	d.
English	77	0	0	to	78	0	0
Chinese, ex-whse.					69	10	0
Crude							—

QUICKSILVER

	£	s.	d.		£	s.	d.
Quicksilver	11	2	6	to	11	10	0

FERRO-ALLOYS AND STEEL-MAKING METALS

Ferro-silicon—	
25%	8 17 6
45/50%	12 10 0
75%	17 19 6
Ferro-vanadium—	
35/50	12/8 lb. Va.
Ferro-molybdenum—	
70/75% carbon-free	4/6 lb. Mo.
Ferro-titanium—	
23/25% carbon-free	9d. lb.
Ferro-phosphorus, 20/25%	£14 10 0
Ferro-tungsten—	
80/85%	3/– lb.
Tungsten metal powder—	
98/99%	3/3 lb.
Ferro-chrome—	
2/4% car.	29 15 0
4/6% car.	23 0 0
6/8% car.	21 12 6
8/10% car.	21 12 6
Ferro-chrome—	
Max. 2% car.	34 0 0
Max. 1% car.	38 15 0
Max. 0.70% car.	42 0 0
70%, carbon-free	10d. lb.
Nickel—99.5/100%	£200 to £205
"F" nickel shot	£184 0 0
Ferro-cobalt, 98/99%	5/3 lb.
Metallic chromium—	
96/98%	2/5 lb.
Ferro-manganese (net)—	
76/80% loose	£10 15 0 to £11 5 0
76/80% packed	£11 15 0 to £12 5 0
76/80% export	(nom.) £9 15 0
Metallic manganese—	
94/96% carbon-free	1/2 lb.

Per ton unless otherwise stated.

HIGH-SPEED TOOL STEEL

Finished bars, 14% tungsten 2s. 0d.
Finished bars, 18% tungsten 2s. 9d.
Per lb. net, d/d buyers' works.

Extras—
Rounds and squares, 3 in. and over 4d. lb.
Rounds and squares, under ½ in. to ¼ in. 3d. lb.
Do., under ¼ in. to 1/8 in. 1/– lb.
Flats, ½ in. × ¼ in. to under 1 in. × ⅜ in. 3d. lb.
Do., under ½ in. × ¼ in. 1/– lb.
Bevels of approved sizes and sections 6d. lb.
Bars cut to length, 10% extra.

SCRAP

	£	s.	d.		£	s.	d.
South Wales—							
Heavy steel	2	15	0	to	2	16	0
Bundled shrngs.					2	7	6
Mixed iron and steel	2	10	0	to	2	12	6
Heavy cast iron	2	10	0	to	2	12	6
Good machinery					2	15	0
Cleveland—							
Heavy steel					2	11	6
Steel turnings					1	15	0
Cast-iron borings					1	5	0
Heavy cast iron	2	12	6	to	2	13	0
Heavy machinery	2	13	6	to	2	14	0
Midlands—							
Light cast-iron scrap					2	7	6
Heavy wrought iron					3	0	0
Steel turnings, f.o.r.					1	14	0
Scotland—							
Heavy steel					2	10	0
Ordinary cast iron	2	11	6	to	2	12	6
Engineers' turnings					2	0	0
Cast-iron borings	1	17	6	to	1	18	0
Wrought-iron piling					2	12	6
Heavy machinery	2	15	0	to	2	16	0

London—Merchants' buying prices, delivered yard.

	£	s.	d.
Copper (clean)	25	0	0
Brass	16	10	0
Lead (less usual draft)	9	10	0
Tea lead	6	10	0
Zinc	8	0	0
New aluminium cuttings	66	0	0
Braziery copper	20	0	0
Gunmetal	23	0	0
Hollow pewter	160	0	0
Shaped black pewter	118	0	0

PIG-IRON

N.E. Coast (d/d Tees-side area)—	
Foundry No. 1	70/–
Foundry No. 3	67/6
,, at Falkirk	67/3
,, at Glasgow	70/3
Foundry No. 4	66/6
Forge No. 4	66/6
Hematite No. 1	69/–
Hematite M/Nos.	68/6
N.W. Coast—	
Hem. M/Nos. d/d Glas.	72/6
,, d/d Birm.	84/6
Malleable iron d/d Birm.	115/–
Midlands (d/d Birmingham dist.)—	
Staffs No. 4 forge	67/–
,, No. 3 fdry.	71/–
Northants forge	63/6
,, fdry. No. 3	67/6
,, fdry. No. 1	70/6
Derbyshire forge	67/–
,, fdry. No. 3	71/–
,, fdry. No. 1	74/–
Scotland—	
Foundry No. 1, f.o.t.	72/6
,, No. 3, f.o.t.	70/–
Hem. M/Nos. d/d	71/–
Sheffield (d/d district)—	
Derby forge	64/6
,, fdry. No. 3	68/6
Lincs forge	64/6
,, fdry. No. 3	68/6
E.C. hematite	81/6
W.C. hematite	83/6
Lancashire (d/d eq. Man.)—	
Derby fdry. No. 3	74/–
Staffs fdry. No. 3	74/–
Northants fdry. No. 3	72/6
Cleveland fdry. No. 3	74/–
Dalzell, No. 3 (special)	102/6 to 105/–
Glengarnock, No. 3	82/6
Clyde, No. 3	82/6
Monkland, No. 3	82/6
Summerlee, No. 3	82/6
Eglinton, No. 3	82/6
Gartsherrie, No. 3	82/6
Shotts, No. 3	82/6

FINISHED IRON AND STEEL

Usual district deliveries for iron; delivered consumer's station for steel.

Iron—	£	s.	d.		£	s.	d.
Bars (cr.)	9	12	6	to	9	15	0
Nut and bolt iron	7	10	0	to	8	0	0
Hoops	10	10	0	and up.			
Marked bars (Staffs) f.o.t.				12	0	0	
Gas strip	10	10	0	and up.			
Bolts and nuts, ¾ in. × 4 in.	14	0	0	and up.			
Steel—							
Plates, ship, etc.	8	15	0	to	8	17	6
Boiler plts.	9	5	0	to	9	7	6
Chequer plts.					10	7	6
Angles					8	7	6
Tees					9	7	6
Joists					8	15	0
Rounds and squares, 3 in. to 5½ in.					9	7	6
Rounds under 3 in. to ⅜ in. (Untested)					8	12	0
Flats—8 in. wide and over					8	12	6
,, under 8 in. and over 5 in.					8	17	6
Rails, heavy	8	5	0	to	8	10	0
Fishplates	12	5	0	to	12	10	0
Hoops (Staffs)					9	7	0
Black sheets, 24g. (4-t. lots)					10	10	0
Galv. cor. shts. (,,)					13	0	0
Galv. flat shts. (,,)					13	10	0
Galv. fencing wire, 8g. plain					14	10	0
Billets, soft	5	10	0	and up.			
Billets, hard	6	17	6	to	7	2	6
Sheet bars	5	0	0	to	5	7	6
Tin bars	5	2	6	to	5	7	6

PHOSPHOR BRONZE

	Per lb. basis.
Strip	9d.
Sheet to 10 w.g.	10d.
Wire	11d.
Rods	10d.
Tubes	13d.
Castings	10 5/8d.

Delivery 3 cwt. free.
10% phos. cop. £30 above B.S.
15% phos. cop. £35 above B.S.
Phosphor tin (5%) £30 above price of English ingots.
C. CLIFFORD & SON, LIMITED.

NICKEL SILVER, &c.

	Per lb.
Ingots for raising	7d. to 1/1
Rolled—	
To 9 in. wide	1/1 to 1/7
To 12 in. wide	1/1½ to 1/7¼
To 15 in. wide	1/1½ to 1/7½
To 18 in. wide	1/2 to 1/8
To 21 in. wide	1/2½ to 1/8½
To 25 in. wide	1/3 to 1/9
Ingots for spoons and forks	7d. to 1/3½
Ingots rolled to spoon size	10d. to 1/6½
Wire round—	
to 10g.	1/4½ to 1/11½

with extras according to gauge.
Special 5ths quality turning rods in straight lengths, 1/3½ upwards.

AMERICAN IRON AND STEEL

At Pittsburgh unless otherwise stated.

	Dols.
No. 2 foundry, Phila.	20.26
No. 2 foundry, Valley	18.50
No. 2 foundry, Birm.	14.50
Basic, Valley	18.00
Bessemer	20.76
Malleable, Valley	18.50
Grey forge, Valley	18.00
Ferro-mang. 80%, seaboard	85.00
O.-h. rails, h'y, at mill	36.37½
Billets	27.00
Sheet bars	28.00
Wire rods	38.00
	Cents.
Iron bars, Chicago	1.80
Steel bars	1.80
Tank plates	1.80
Beams, etc.	1.80
Skelp, grooved steel	1.70
Steel hoops	2.10
Sheets, black, No. 24	2.40
Sheets, galv., No. 24	3.10
Wire nails	2.60
Plain wire	2.30
Barbed wire, galv.	3.00
Tinplates, 100-lb. box	$5.25

COKE (at ovens)

Welsh foundry	25/– to 30/–
,, furnace	19/– to 20/–
Durham foundry	20/– to 25/–
,, furnace	17/6
Midlands, foundry	—
,, furnace	—

TINPLATES

f.o.b. Bristol Channel ports.

I.C. cokes	20×14 per box	18/2 to 19/–
,,	28×20 ,,	36/4 to 38/–
,,	20×10 ,,	26/– to 26/3
,,	18¾×14 ,,	18/6 to 18/9
C.W.	20×14 ,,	15/6 to 16/6
,,	28×20 ,,	33/– to 33/6
,,	20×10 ,,	23/– to 24/–
,,	18¾×14 ,,	16/– to 17/–

SWEDISH CHARCOAL IRON & STEEL

Pig-iron	£6	0	0	to	£7	0	0
Bars-hammered, basis	£16	0	0	to	£16	10	0
Bars and nail-rods, rolled, basis	£15	15	0	to	£16	0	0
Blooms	£10	0	0	to	£12	0	0
Keg steel	£30	0	0	to	£31	0	0
Faggot steel	£18	0	0	to	£23	0	0
Bars and rods dead soft, st'l	£10	0	0	to	£12	0	0

All per English ton, f.o.b. Gothenburg.
[Subject to an exchange basis of Kr. 18.16 to £1.]

DAILY FLUCTUATIONS

Standard Copper (cash)

	£	s.	d.		
Jan. 31 ..	27	11	3	inc.	6/3
Feb. 1 ..	27	15	0	,,	3/9
,, 4 ..	27	11	3	dec.	3/9
,, 5 ..	27	5	0	,,	6/3
,, 6 ..	27	2	6	,,	2/6

Electrolytic Copper

	£	s.	d.		
Jan. 31 ..	30	15	0	inc.	10/–
Feb. 1 ..	30	15	0	No	change
,, 4 ..	30	10	0	dec.	5/–
,, 5 ..	30	5	0	,,	5/–
,, 6 ..	30	5	0	No	change

Standard Tin (cash)

	£	s.	d.		
Jan. 31 ..	233	15	0	inc.	20/–
Feb. 1 ..	233	15	0	No	change
,, 4 ..	233	10	0	dec.	5/–
,, 5 ..	233	0	0	,,	10/–
,, 6 ..	232	15	0	,,	5/–

Tin (English ingots)

	£	s.	d.		
Jan. 31 ..	233	17	6	inc.	17/6
Feb. 1 ..	233	17	6	No	change
,, 4 ..	233	12	6	dec.	5 –
,, 5 ..	233	2	6	,,	10/–
,, 6 ..	233	0	0	,,	2/6

Spelter (ordinary)

	£	s.	d.		
Jan. 31 ..	12	2	6	No	change
Feb. 1 ..	11	15	0	dec.	7/6
,, 4 ..	11	16	3	inc.	1/3
,, 5 ..	11	16	3	No	change
,, 6 ..	11	15	0	dec.	1/3

Spelter (Electro, 99 per cent.)

	£	s.	d.		
Jan. 31 ..	14	11	3	dec.	1/3
Feb. 1 ..	14	8	9	No	change
,, 4 ..	14	8	9	,,	,,
,, 5 ..	14	8	9	,,	,,
,, 6 ..	14	7	6	dec.	1/3

Zinc Sheets (English)

	£	s.	d.		
Jan. 31 ..	23	10	0	No	change
Feb. 1 ..	23	10	0	,,	,,
,, 4 ..	23	10	0	,,	,,
,, 5 ..	23	10	0	,,	,,
,, 6 ..	23	10	0	,,	,,

Lead (English)

	£	s.	d.		
Jan. 31 ..	12	10	0	No	change
Feb. 1 ..	12	5	0	dec.	5/–
,, 4 ..	12	5	0	No	change
,, 5 ..	12	5	0	,,	,,
,, 6 ..	12	5	0	,,	,,

AVERAGE MONTHLY PRICES OF UNMARKED BARS (SOUTH STAFFS).

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly average
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1901	8 0 0	7 10 0	7 5 0	7 0 0	6 10 0	6 10 0	6 10 0	6 10 0	6 15 0	6 15 0	6 15 0	6 15 0	6 17 11
1902	7 0 0	6 10 0	6 15 0	6 15 0	6 15 0	6 10 0	6 10 0	6 15 0	6 15 0	6 15 0	6 10 0	6 10 0	6 13 4
1903	6 10 0	6 10 0	6 10 0	6 10 0	6 10 0	6 10 0	6 10 0	6 10 0	6 10 0	6 10 0	6 7 0	6 5 0	6 9 4
1904	6 5 0	6 5 0	6 5 0	6 10 0	6 10 0	6 5 0	6 0 0	6 0 0	6 0 0	6 0 0	6 0 0	6 0 0	6 2 11½
1905	6 5 0	6 5 0	6 0 0	5 17 6	5 15 0	5 15 0	5 15 0	5 15 0	6 0 0	6 5 0	6 15 0	6 15 0	6 1 10½
1906	7 0 0	7 5 0	7 5 0	7 5 0	6 17 6	6 15 0	6 12 6	6 10 0	6 10 0	6 12 6	6 16 3	7 3 9	6 17 8
1907	7 3 9	7 5 0	7 5 0	7 5 0	7 5 0	7 7 6	7 5 0	7 7 6	7 7 6	7 7 6	7 7 6	7 5 0	7 5 11
1908	7 2 6	7 0 0	7 0 0	7 0 0	6 15 0	6 7 6	6 5 0	6 2 6	6 2 6	6 2 6	6 2 6	6 0 0	6 10 0
1909	6 0 0	6 0 0	6 0 0	6 0 0	6 0 0	6 0 0	6 0 0	5 17 6	6 0 0	6 2 6	6 2 6	5 17 6	5 19 9½
1910	6 2 6	6 3 4½	6 7 6	6 7 6	6 7 6	6 7 6	6 6 6	6 5 0	6 5 0	6 5 0	6 5 0	6 5 0	6 5 7
1911	6 5 0	6 5 0	6 5 0	6 5 0	6 5 0	6 5 0	6 5 0	6 5 0	6 5 0	6 10 0	6 12 6	6 16 6	6 7 0
1912	6 18 9	7 1 10	7 8 9	7 18 0	7 18 0	8 0 7	8 2 6	8 3 6	8 5 0	8 6 3	8 7 6	8 8 9	7 17 0
1913	8 11 6	8 10 7½	8 10 0	8 8 1½	8 2 0	8 0 0	7 17 6	7 11 6	7 8 9	7 5 6	6 18 1½	6 17 6	7 16 9
1914	6 17 6	6 15 7½	6 12 6	6 10 0	6 10 0	6 10 0	6 10 0	7 11 10½	8 0 0	7 12 6	7 5 7½	7 6 3	7 1 0
1915	7 11 6	8 5 11	8 8 9	9 6 0	10 3 2	10 19 2	11 12 6	11 13 1½	11 13 9	11 14 3	12 1 10½	13 0 9	10 6 0
1916	13 7 6	13 10 8	13 12 9½	13 15 0	13 15 0	13 15 0	13 15 0	13 15 0	13 15 0	13 15 0	13 15 0	13 15 0	13 8 9½
1917	13 15 0	13 15 0	13 15 0	13 15 0	13 15 0	13 15 0	13 15 0	13 15 0	13 15 0	13 15 0	13 15 0	13 15 0	13 15 0
1918	13 15 0	13 17 3	13 17 6	13 17 6	13 17 6	13 17 6	13 17 6	14 15 0	14 15 0	14 15 0	14 15 0	14 15 0	14 4 5½
1919	15 10 0	16 5 0	17 15 0	17 15 0	20 15 0	21 0 0	21 0 0	22 0 0	22 0 0	22 0 0	22 7 6	22 12 6	20 1 8
1920	24 7 6	24 10 0	25 10 0	27 10 0	29 5 0	31 0 0	31 10 0	31 10 0	31 10 0	31 10 0	31 10 0	29 7 6	29 1 8
1921	26 17 3	25 0 0	23 0 0	21 0 0	19 0 0	18 5 0	16 0 0	16 0 0	15 14 0	14 0 0	13 6 8	13 0 0	19 4 5
1922	13 0 0	12 3 9	11 14 0	11 11 10½	11 5 0	11 3 6	11 2 6	11 5 0	10 17 2½	10 16 3	10 13 0	10 12 6	11 7 0½
1923	10 16 10½	11 3 1½	12 2 6	12 8 9	12 11 6	12 1 3	11 15 11½	11 15 0	11 15 0	11 15 0	12 13 6	12 8 3	11 18 10½
1924	12 9 6	12 10 0	12 10 0	12 15 7½	12 17 6	12 17 6	12 17 6	12 17 6	12 17 6	12 14 0	12 12 6	12 12 6	12 14 3½
1925	12 12 6	12 12 6	12 12 6	12 12 6	12 12 6	12 7 6	12 7 6	12 7 6	12 4 6	11 18 6	11 13 9	11 13 0	12 6 2½
1926	11 7 9½	11 5 0	11 5. 0	11 5 0	11 3 9	11 3 9	11 5 0	12 0 0	13 0 0	•	15 7 6	12 19 0	12 0 2
1927	12 6 3	12 2 6	11 14 0	11 0 0	10 18 9	10 13 6	10 12 6	10 5 0	9 16 0	9 15 0	9 13 9	9 12 9	10 14 2
1928	9 12 6	9 12 6	9 11 0	9 10 0	9 8 4	9 5 0	9 5 0	9 5 0	9 5 0	9 5 0	9 3 6	9 1 3	9 7 0
1929	9 0 0	9 2 6	9 5 7½	9 9 4½	9 10 0	9 17 6	10 2 6	10 2 6	10 2 6	10 0 6	10 3 9	10 5 7	9 15 2½
1930	10 7 6	10 7 6	10 7 6	10 6 10½	10 6 3	10 5 0	10 2 6	10 2 6	10 2 6	10 2 6	10 2 6	10 2 6	10 4 7½
1931	10 2 6	10 0 0	10 0 0	10 0 0	9 18 1½	9 17 6	9 17 6	9 17 6	9 17 6	9 17 6	9 17 6	9 16 10½	9 18 0½
1932	9 15 0	9 15 0	9 15 0	9 15 0	9 13 9	9 11 3	9 10 0	9 10 0	9 10 0	9 6 3	9 5 0	9 5 0	9 10 11½
1933	9 5 0	9 5 0	9 5 0	9 5 0	9 5 0	9 5 0	9 5 0	9 5 0	9 5 0	9 5 0	9 5 0	9 5 0	9 5 0
1934	9 5 0	9 8 1½	9 12 6	9 12 6	9 12 6	9 12 6	9 12 6	9 12 6	9 12 6	9 12 6	9 12 6	9 12 6	9 11 6
1935	9 12 6	—	—	—	—	—	—	—	—	—	—	—	—

• No quotation available owing to strike.

WILLIAM JACKS & COMPANY,

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(A remittance should accompany instructions.)

SITUATIONS VACANT AND WANTED

ADVERTISER seeks position with progressive firm as Foundry Works Manager or Superintendent with sole charge of pattern-shop; 10 years superintendent with American corporation; first-class references.—Box 128, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

FOUNDRY Foreman requires position; practical man, sound experience general engineering, jobbing and machine-moulding; take entire charge of small foundry as Working Foreman; best results possible.—Box 138, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

METALLURGICAL Chemist, young and competent, seeks post with progressive firm in Midlands.—Box 134, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

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EMPLOYMENT REGISTER.

Conducted by the Institute of British Foundrymen by courtesy of the proprietors of THE FOUNDRY TRADE JOURNAL.

Correspondence should be addressed to the General Secretary, Institute of British Foundrymen, St. John Street Chambers, Deansgate, Manchester, from whom full particulars can be obtained of this service.

Any employer wishing to communicate with a candidate should write to the General Secretary, quoting identification number.

FOUNDRY Manager requires position; has had considerable experience in complete control, locomotive, railway and general engineering work. Iron, steel, non-ferrous and patternshop. (254)

METAL Patternmaker desires position as Charge over metal patternshop or progressive position attached to foundry. Accustomed to ferrous and non-ferrous casting production, modern methods. Technically trained in foundry practice and science, metallurgy, foundry calculations and making of working drawings. Age 29. (255)

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IRON Foundry in London district, up-to date plant, electric overhead crane, castings up to 3 tons, for Sale, or would consider Active Partner with capital.—Reply, Box 146, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

MACHINERY

REQUIRED FOR EXPORT TO AUSTRALIA, modern Foundry Plant and Machinery of all kinds to equip large iron and brass foundry; new or secondhand; good prices paid; repairable plant purchased if modern.—Box 136, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

FOR Sale, surplus to requirements, two E.R.3 type Universal Roll-over Moulding Machines, Hydraulic Squeeze, in new condition; pressure 10 tons at 750 lbs. per sq. in., available height between table and ramming plate 2 ft. 0¾ in., stroke of ramming piston 11⅛ in., stroke of drawing piston 4 in. Will take boxes up to 31½ in. long x 21¼ in. wide. What offers?—WILLEY & COMPANY, LIMITED, Engineers, Exeter.

NEW Dwarf Cupola, to melt 10 to 15 cwts. per hr. New Worm-geared Ladles, 5 tons, 25 cwts., 15 cwts. and 10 cwts. capacity. Ungeared Ladles, 15 cwts. and 10 cwts. capacity. Improved Cupola Spark Arresters.—T. DAVIES & SON, West Gorton, Manchester.

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Room Plants, sizes 12 ft. x 12 ft., 12 ft. x 9 ft. and 6 ft. x 6 ft., made up in cast-iron sections.

Barrel Plants, 30 in. dia. x 36 in. long and 30 in. dia. x 18 in. long rotary barrels.

Cabinet Plants, in sizes 4 ft. x 4 ft. x 4 ft., 36-in. dia. and 30-in. dia. operators' cabinets.

Most of the above by Tilghman and complete with Air Compressors.

HAND MOULDING MACHINES

By Adaptable, Pridmore, Darling & Sellars, etc.; Squeezers by Utard (unused), Samuelson and Britannia, also Farwell Universal Type.

Ladles, Grinding Machines, Exhaust Fans, Blowers, Air Compressors and 500 Electric Motors and Dynamos.

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'Phone: Broadwell 1359.

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15" cen. Vert. BORING and SURFACING LATHE (Lang), 2⅛" dia. hollow spindle; 30" dia. faceplate; bed 9' 0" long.

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5 LANCS BOILERS, 30' x 8', 100 lbs. w.p.

About 95 tons of "Universal" Sheet Steel PILING, consisting of 15" x 5" R.S. Joists, in lengths varying from 11/20', with interlocks.

Write for "Albion" Catalogue.

Grams: "Forward." 'Phone: 23001 (10 lines).

ALBION WORKS, SHEFFIELD

MISCELLANEOUS

WANTED, 80/100 Secondhand Light Moulding Boxes, good condition, inside sizes 13½ in. square by 3½ in. deep. Pin centres 16¼ in. or nearest. Also Secondhand Pyrometer Recorder suitable for coal-fired annealing oven.—Box 140, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

FLUIDITY TESTS as described in THE FOUNDRY TRADE JOURNAL, February 1, 1934. Patterns of the above in aluminium can be supplied for 35s. per set. Post free. We can also supply Patterns for all branches of the engineering trade, in hard or soft woods. Send us your inquiries.—FURMSTON & LAWLOR, Patternmakers, Letchworth, Herts.

MISCELLANEOUS—*Continued*

PLATE Moulding Table, practically new, size 5 ft. 9 in. x 3 ft. 9 in.; cost £138. Open to offer. Also Annealing Cans and Stools (New), sizes and weight as follow:—

24 Cans ea. 14 in. x 17 in.
24 Cans ea. 14 in. x 18 in.
Weight 5 tons 8 cwts.
25 Stools. Weight 1 ton 3 cwts.

Box 148, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

PATTERNS.—Inquiries solicited; quotations by return; shop equipped with modern machinery; quick delivery.—CLEGHORN & COMPANY, Midland Pattern Works, Spring Gardens, Worcester. 'Phone 264.

CEYLON PLUMBAGO (in casks), Empire produce—direct import, always in stock.—Quotation and samples from WILLIAM OLSEN, LIMITED, Hull.

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406 OSBORN jolt rollover.
18"×36" TABOR rollover shockless (portable).
40"×30" TABOR rollover shockless.
TWO BRITANNIA No. 1 jolters.
HAND Machines taken in part payment for above or exchanged.

EXTENDED PAYMENTS ARRANGED.

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12' × 9' Tilghman sandblast room, built of cast iron plates, complete with 400 cu. ft. Tilghman air compressor and all accessories.
T.B. 4 Tilghman sandblast barrel plant, complete. Size of barrel 60" × 40".
T.B. 1 Tilghman sandblast barrel.
Small Tilghman rotary table sandblast.

BUY FROM ME AND SAVE MONEY!

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PETER—WITH ONE EXCEPTION

With one exception Peter is an ordinary little fellow. Chubby, likeable, just five-and-a-half, full of life and fun and on occasions—be it admitted—of naughtiness.

Just now Peter's rather important, for this is his first term at school, and he's grappling with the intricacies of "A B C" and "Twice-Two": difficult subjects to all men of five-and-a-half, but even more difficult in Peter's case because—bad luck—he's totally blind. That's his One Exception.

Peter learns reading, writing, and 'rithmetic through the medium of "Braille"—dull stuff compared with the coloured picture books of most five-and-a-halfs. However, he's a stout lad is Peter, and he's making great progress.

Would you like to know more about him? How, in spite of his "One Exception," he is being educated and, when older, technically trained and usefully employed.

There is a long waiting list of "Peters" throughout the British Isles, for whom training and accommodation must be provided in the immediate future.

Will you help with a donation or annual subscription? Any sum, large or small, will be gratefully received.

Here's a suggestion. Your eyesight is worth 3d a year to you. Send Peter and his handicapped pals 3d for every year you've had it. Now, please, in case it slips your memory. Good idea?

The Chairman,
SCHOOL FOR THE BLIND
(Founded 1838)
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